Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

Vol. XI.---No. 16. (NEW SERIES.) NEW YORK, OCTOBER 15, 1864. $3 PER ANNUM (IN ADVANCE

Improved Awnings.

The engravings published herewith represent a new kind of awning intended for windows, doors, or stores. It is constructed of wooden slats, A, which are provided with cords, B, secured to pins, C; in the eyelet holes, D, as shown in Fig. 2. By pulling on the loose end of the cord the slats are all drawn up, like a venetian blind, to the top of the frame, E. This frame is of iron and is jointed to the building at F, so that it also can be raised against the side of the house, thus leaving all flush and secure in stormy

Fig. 1.

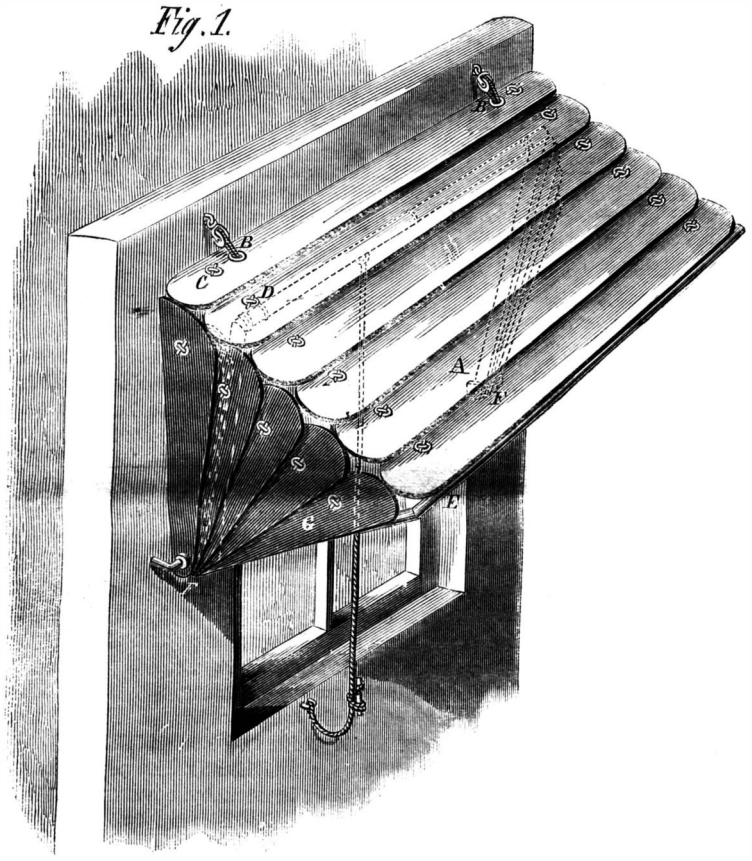
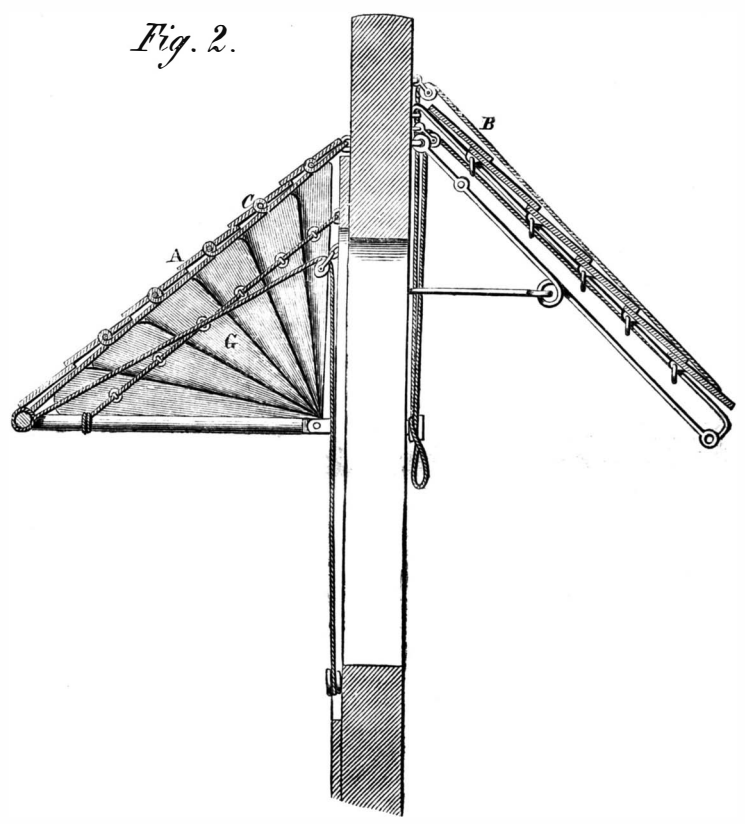


Fig. 2.



ARMSTRONG'S AWNINGS.

weather. At the sides of the awnings there are similar wooden slats, G, which are jointed at the bottom so that they shut up like a fan when the frame is erected as shown by the dotted lines. Fig. 2 shows a section of the arrangement in which similar letters indicate like parts. This awning was patented on June 14, 1864, through the Scientific American Patent Agency; for further information address the inventor William Armstrong, care of J. T. L. Chase & Co., Box 1,298, Milwaukee, Wis.

KEROSENE LAMP WICKS.—A correspondent says :—"In the present price of kerosene lamp wicks, people can make a better wick than they buy by taking cotton flannel, of which all have pieces, and folding it up three thicknesses, just wide enough to go into the tube, and catching the edge with coarse stitches."

THE engines of the English frigate *Retribution* cost originally $225,000. They were recently broken up for old iron when the materials sold for $10,000. A very small proportion of the first cost.

THE present consumption of gas in Boston is about 1,000,000 feet daily. In the shortest days it reaches 1,600,000 feet

The Western Reserve.

Among the valuable vocabularies in the appendix to the new edition of Webster's Unabridged Dictionary, is a list of the noted names in fiction, and of the phrases most frequently encountered in reading, with explanations of their meanings. We give one of these explanations as a sample:—

"THE WESTERN RESERVE.—A name given to a region of country reserved by the States of Virginia and Connecticut at the time of the cession of the Northwest Territory to the United States. Disputes arose after the war of the revolution between several of the States, respecting the right of soil in this territory, which were only allayed by the cession of the whole to the United States, Virginia reserving 3,709,848 acres, near the rapids of the Ohio, for her State troops, and Connecticut a tract of 3,666,921 acres near Lake Erie. In 1800 jurisdiction over these two tracts was relinquished to the Federal Government, the States reserving the right to the soil, and disposing of it in small lots to settlers (from which sales Connecticut obtained her magnificent school fund); while the Indian titles to the rest of the soil were bought up by the general Government. In 1799 the Northwest Territory was organized, and in 1803 Ohio was admitted as a State into the Union."

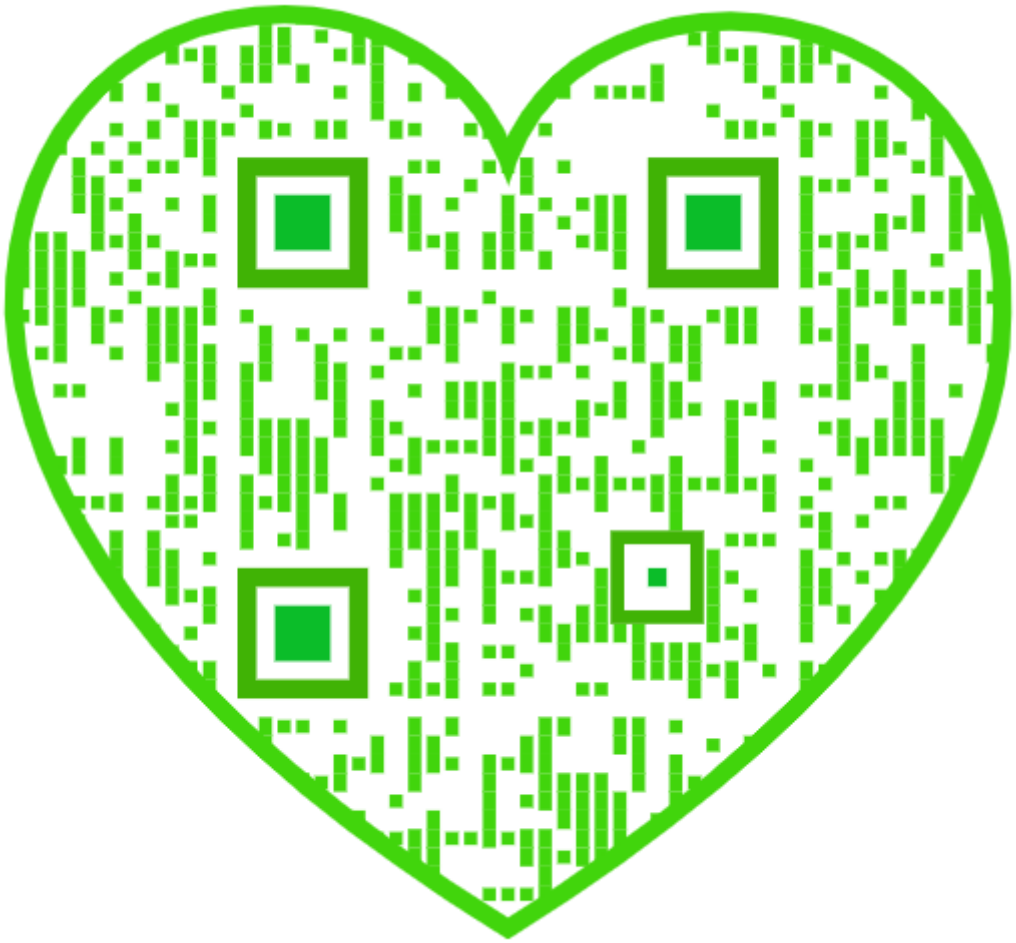
How Peat is Obtained.

The following is cut from an exchange whose name has escaped us:—

"Peat may be obtained in two ways from the soil. One way is by cutting it into pieces about the size of bricks by an implement of hardened iron or steel in the form of a book cover, the sides standing at right anges. This implement is attached to a handle of convenient length, and the party using it dexterously can cut the peat so rapidly as to occupy the time of two persons wheeling it to a distance of four or five rods for the purpose of spreading and drying. If the peat be very soft or watery, the process of spreading is delayed for a day or two, when the work may be performed without danger of breaking. In cases where the peaty matter is not sufficiently adhesive to cut, the plan of working it into a stiff batter—so to speak—is adopted, and this batter wheeled to a distance, and spread evenly to be dried. Immediately after spreading, a person goes through the matter, and with his thumbs joined at their tops, but his hands apart, cuts or marks the bed into solid parallelograms of the width that his hands are apart, and about ten inches long. During this process he is moving backward, so that the work before him is unbroken by footmarks. In a few days, when the bed is pretty well soaked, a person singles out the parallelograms, with some sharp instrument, while a companion follows and sets them on end, leaning them against ~~each~~ ~~other~~ to dry. These two processes—the cutting with a sharp implement and the forming with the hands—are those used in countries where peat is the general fuel, and can be put in practice by any ordinary workman.

"In some cases where the soil merely approaches a moorish nature, and is incapable of being converted into peat by either of the processes named, the surface, if properly cut and dried, and used for fuel, not for cooking purposes, but merely ignited in quantity, will produce a tolerable amount of heat. To be sure, the article thus obtained can only be used in an open fireplace, but it is certainly worth a trial and the trouble. Let us not be too particular about the quality of our fuel if we can by any means obtain the quantity we require, or even a portion of the quantity necessary to keep Mr. John Frost from pinching our toes during the coming winter."

© 1864 SCIENTIFIC AMERICAN, INC.



AMERICAN KID GLOVES.—HOW THEY ARE MADE.

DESCRIPTION OF PROCESS AND MATERIAL.

In dressing kid or goat skins for gloves the process varies considerably from that practiced upon buck and sheep skins. The skins are first soaked in water and "fleshed," and are then thrown into the vats of lime-liquor. From these they are removed after a period that varies from three to six weeks, according to the season of the year, a much longer time being required for most of the processes in winter than in summer. Here they are lifted, and turned, and moved, and replaced until the hair is sufficiently loosened. They are then taken from the vats and stretched upon the "beam," and the hair is then removed with the blunt drawing-knife, but not the grain, as in the coarser skins; and great care is taken not to deface nor injure the surface. They are next put into a "drench" of bran and water, or more properly moistened bran, where they remain for a considerable time. This softens and renders the skin very pliable. On being removed from this the tanning process takes place. The skins are covered by a mixture of salt and alum, which soon makes leather of them. After being thoroughly cleansed and dried they are ready for the finishing processes. They are suspended and "staked," that is, evened by a blunt knife drawn over the surface. Afterwards they are spread out upon a flat surface and rubbed with a sponge dipped in the beaten yolk of eggs. This preparation is absorbed by the leather and serves to make it elastic.

THE COLORING PROCESS.

The next and last process is coloring. Liquid dyes are used for this purpose, and they are applied to the surface or grain of the leather with a brush. It is said that we have now no native workmen who understand this process thoroughly, and the skilled foreign workmen employed in the factories are by no means willing to impart their knowledge. Thus far they have succeeded in maintaining the secret of the rare dyes, and the methods that give both brilliancy and permanency of color to the better styles of glove leather. Even the employers are not permitted to gain this knowledge.

Having the matter so entirely in their own hands, these men have been able hitherto to sustain this attempt at secrecy. But the constant introduction of workingmen from Europe, and the preparations which the manufacturers are now making, some of which are already completed, will soon unveil the mystery, and Yankee skill will, doubtless, achieve results equal to that of Europeans.

SUPERIORITY OF FRENCH WORKMEN.

It is a noticeable fact that of the foreign workmen now in this country the French still maintain the supremacy. Englishmen make good leather and good gloves, but in elasticity, durability, and finish, as well as in the beauty and brilliancy of the coloring, the French far surpass them. In the cutting and making up of gloves it is still the same. A better fit is obtained by a French workman, and the sewing is superior.

Besides, a Frenchman will cut one or two more pairs of gloves out of a skin than an Englishman, and still have no inferior ones. "Yankees are in too great a hurry to perform such work well," remarked a manufacturer; "they pride themselves rather upon the amount of labor performed in a given time, than upon the skill displayed;" which is doubtless true. So that until our countrymen learn the lesson of patience, they will not be likely to rival their foreign competitors in glove-making.

GLOVE-CUTTING.

After all the process of trimming, finishing, and dying are completed, the skin is stretched upon a marble table and rubbed with a blunt knife. It is then cut through the middle, and a strip for the palm and back of a glove cut, just wide enough for the purpose, from one end of each piece. Being cut in this way the pairs are alike, of similar finish, thickness, and tint. In France 375,000 dozens of skins are thus cut annually. In time, with protection and native industry, there is no reason why as large a number should not be manufactured here.

A French glove-cutter cuts nearly all his "sized gloves" by eye. By sized gloves is meant those whose size is indicated by numbers, which includes all ladies' kid gloves and all the finer men's gloves. In securing an accurate and easy fit, great care is necessary in placing the thumb-hole. M. Jouvin has invented a mode of cutting the thumb with the hand.

In some factories these gloves are cut in part by punches, steel instruments similar to the "gouges" used in cutting buck gloves, and described in a former article. These punches have a toothed apparatus that pricks the holes for the stitches. The seams are then sewed with perfect regularity, by laying the edges evenly together, and placing them in a vice provided with teeth one-twelfth of an inch apart, between which teeth the needle passes in sewing. After the seams are sewed the embroidery is put upon the back, the wrist bound or otherwise finished, and the fastenings sewed on. The glove is then stretched, then placed in a linen cloth slightly dampened, and beaten to make it more flexible. It is then pressed, and is ready for the market.

THE MATERIAL.

The skins used in making fine gloves are usually those of the kid and goat, but many are made of Cape sheep, and other fine and flexible leather. It has been repeatedly and confidently asserted that many of the most celebrated styles of French gloves were made from the skins of rats, and we have even seen the statistics of the rat-catching trade, fostered, as it was asserted, by the demand created by gloves, set forth in a startling array of figures, which went to show that this most prolific of the rodents was destined to speedy annihilation. The catacombs of Paris were said to be the great hunting ground of the rat-catchers, and the business of trapping the animals, and dressing the skins, to be one of growing importance. But these statements do not appear to be borne out by facts. Very few, if any, rat skins have been used for gloves. The skins are not large enough to cut any but a small-sized glove, which alone disproves the assertion that they are largely used.

IMPORTED SKINS.

Many dressed kid-skins are imported into this country at present. Most of them come from France and Germany. It is probable that the demand for gloves for importation has considerably decreased, and the surplus skins are sent to this country instead. A fine lot, of the best finish and choicest colors, was recently sold in this city as low as eight dollars in gold, and this though the duty on dressed skins is one hundred per cent. From these skins, and they are such as have never before been offered in this market, we may expect to see our American manufacturers produce gloves that rival the best French ones.

A very good article of genuine kid, as well as of Cape sheep gloves, both for ladies and gentlemen, is now made in Gloversville, in Philadelphia, in Watertown, Mass., and possibly elsewhere in the country, but those are the principal seats of the manufacture. A large number of skilled workmen in this branch of business have already been brought to this country, and several enterprising manufacturers are now in Europe purchasing machinery and securing operatives. The present tariff protects efforts of this kind, and the result will be to increase largely all, or nearly all, manufacturing interests.

FUR GLOVES.

A variety of fur gloves is made in this country. Nearly all manufacturing furriers make them. Gloves are sometimes made with the inner portion or palm of kid or dog skin, and the back of fur. They are lined with flannel or an inferior quality of fur, usually the white squirrel or coney, and are well adapted to use in winter traveling, for driving, etc. As they are easily made from the small pieces of fur left in cutting larger articles, they are very profitable to the manufacturer. The sewing of these, as of most kinds of gloves, is done by women, and gives employment to a large number.

INDIA-RUBBER GLOVES.

A large number of india-rubber gloves are made in this country under Goodyear's patent. They are manufactured principally at Naugatuck, Conn. The heavy rubber gloves and mittens are intended for the use of manufacturing chemists, druggists, and photographers, or all who work among acids, alkalies, and other caustic materials. The rubber is not affected by these articles, and effectually protects the hands. They are also adapted to the use of firemen, hatters, tanners, lumbermen, and a variety of mechanics. They are useful to dyers, and to those whose avocations expose them to storms. These heavy gloves are made of solid rubber, as the india-rubber overshoes were formerly.

The first process in the manufacture is to heat slightly a mass of the gum, called a "batch," which in this state is passed between revolving cylinders and becomes a flat sheet of the required size. From this sheet the gloves and mittens are cut by gouges similar to those employed in the cutting of leather gloves. They are then joined by placing the edges in contact, and covering them with strips of heated rubber.

The lighter styles of rubber gloves are made thus: a piece of stockinet, or cotton cloth, usually the former, is passed through the cylinders at the same time with the "batch" of gum, which by this process completely coats it. From this the gloves are cut and joined by covering the edges with strips of heated rubber. These gloves are made of a variety of colors, are very soft and pliable, and have a very neat finish. They are very useful in domestic pursuits and gardening, and to be worn in all kinds of employment likely to discolor the hands. By protecting the hands from the atmosphere, and retaining the insensible perspiration, they soften them and increase their whiteness; and often prove a cure for chapped hands and salt-rheum. The joining of these gloves is done by women, and is considered a healthful and profitable employment. We do not learn that there are as yet any silk or cloth gloves made in this country.—*Evening Post.*

Manufacture of Chlorine.

Many means have been employed for the manufacture of chlorine, including the application of the bichloride of copper and other bichlorides, but hitherto without success. Mr. de Tregomain has patented an invention which relates to improvements in the manufacture of chlorine by means of bichlorides, and also to the method of revivifying the latter. After the bichloride, which is heated to a deep red, has disengaged about half its chlorine, and has changed to a state of protochloride, he collects it, while in a state of fusion, and pours it on marble slabs, and then grinds it in a mill. The powder he obtains is introduced into a revivifying apparatus, in which he passes a current of air of sufficient amount, when the protochloride in powder, in coming in contact with the oxygen of the air, becomes changed into oxychloride or mixture of binoxide and bichloride of copper. In order to effect the revivification, he places the powdered oxychloride in stoneware vessels, containing hydro chloric acid at 23° Beaume, in the proportion of about 1 cwt. of dry oxychloride to 100 lbs. of acid. The matters are then heated, cooled, and crystallized, and the mother water drawn off, the crystals being dried and distilled over again.

Protecting Iron-work from Salt Water.

One of the great difficulties which salt men have to encounter is the rapid destruction of the tools used in pumping, by the action of the salt water contained in the wells. Plunging rod joints, piping, everything in fact soon becomes useless by being subjected to the action of the water in the wells. For this there has never, until recently, been found an adequate remedy. Mr. J. H. Fairbank, however, has at length discovered a remedy which promises to overcome the difficulty. It is simply this:—Heat the iron-work which is to be exposed to the water in the wells, and rub it, while warm, with the soft coke which comes from the stills. This forms a coating which is impervious to the action of the water, and effectually prevents the iron from being touched. Of course friction will wear it off, but all iron-work not exposed to friction can be preserved in this way.—*Oil Spring Chronicle.*

[So it can by painting it with red lead and boiled oil. The above plan is cheaper, however.—EDS.

THE market-keeper of Grimsby market, England recently seized several pounds of light butter belonging to different owners attending the market. It was forfeited and distributed amongst poor widows

© 1864 SCIENTIFIC AMERICAN, INC.

Galvanizing Iron.

Ure, in the supplement to his dictionary, gives the various processes of galvanizing as follows:—

In 1837, Mr. H. W. Crawfurd patented a process for zincing iron. In the "Repertory of Patent Inventions," his process is thus described:—Sheet-iron, iron castings, and various other objects in iron, are cleaned and scoured by immersion in a bath of water acidulated with sulphuric acid, heated in a leaden vessel, or used cold in one of wood, just to remove the oxide. They are then thrown into cold water, and taken out one at a time to be scoured with sand and water with a piece of cork, or more usually with a piece of the husk of the cocoanut, the ends of the fibers of which serve as a brush, and the plates are afterwards thrown into cold water.

Pure zinc covered with a thick layer of sal ammoniac is then melted in a bath, and the iron, if in sheets, is dipped several sheets at a time in a cradle or grating. The sheets are slowly raised to allow the superfluous zinc to drain off, and are thrown whilst hot into cold water, on removal from which they only require to be wiped dry.

Thick pieces are heated, before immersion, in a reverberatory furnace, to avoid cooling the zinc. Chains are similarly treated, and on removal from the zinc require to be shaken until cold, to avoid the links being soldered together. Nails and small articles are dipped in muriatic acid, and dried in a reverberatory furnace, and then thrown all together in the zinc, covered with the sal ammoniac, left for one minute, and taken out slowly with an iron skimmer. They come out in a mass, soldered together, and for their separation are afterwards placed in a crucible and surrounded with charcoal powder, then heated to redness and shaken about until cold, for their separation. Wire is reeled through the zinc, into which it is compelled to dip by a fork or other contrivance. It will be understood that the zinc is melted with a thick coat of sal ammoniac to prevent the loss of zinc by oxidation.

Mr. Mallett coated iron with zinc by the following process;—The plates are immersed in a cleansing bath of equal parts of sulphuric or muriatic acid and water, used warm; the works are then hammered and scrubbed with emery and sand to detach the scales, and to thoroughly clean them; they are then immersed in a "preparing bath" of equal parts of saturated solutions of muriate of zinc and sal ammoniac, from which the works are transferred to a fluid metallic bath, consisting of 202 parts of mercury and 1,292 parts of zinc, both by weight, to every tun weight of which alloy is added above one pound of either potassium or sodium, the latter being preferred. As soon as the cleaned iron works have attained the melting heat of the triple alloy, they are removed, having become thoroughly coated with zinc. At the proper fusing temperature of this alloy, which is about 680° Fah., it will dissolve a plate of wrought-iron of an eighth of an inch thick in a few seconds.

Morewood and Rogers's galvanized tinned iron is prepared under several patents. Their process is as follows:—The sheets are pickled, scoured and cleaned just the same as for ordinary tinning. A large wooden bath is then half filled with a dilute solution in muriate of tin, prepared by dissolving metallic tin of concentrated muriatic acid, which requires a period of two or three days. Two quarts of the saturated solution are added to 300 or 400 gallons of the water contained in the bath. Over the bottom of the bath is first spread a thin layer of finely-granulated zinc, then a cleaned iron plate, and so on, a layer of granulated zinc and a cleaned iron plate alternately, until the bath is full. The zinc and iron, together with the fluid, constitute a weak galvanic battery, and the tin is deposited from the solution so as to coat the iron with a dull uniform layer of metallic tin in about two hours. The tinned iron is then passed through a bath containing fluid zinc, covered with sal ammoniac mixed with earthy matter, to lessen the volatilization of the sal ammoniac, which becomes as fluid as treacle. Two iron rollers immersed below the surface of the zinc, are fixed to the bath and are driven by machinery to carry the plates through the fluid metal at any velocity previously determined. The plates are received one by one from the tinning bath, drained for a short time, and passed at once, whilst still wet, by means of the rollers, through the bath as described. The plates take up a very regular and smooth layer of zinc, which, owing to the presence of the tin beneath, assumes its natural crystalline character, giving the plates an appearance resembling that known as the *moiree metallique*.

It is stated that galvanized iron plates, cut with shears so as to expose the central iron, become zinced round the edges, and at the holes where the nails were driven. We are also informed that *ungalvanized iron* will, if moist when near galvanized plate, become zinced, and that telegraph wires, where cut through, become coated by the action of the rain water on the galvanized portion of the surfaces.

It has been stated that the galvanized iron is not more durable than unprotected iron; that, indeed, where the zinc is by any accident removed, the destruction is more rapid than ordinary. We have made especial inquiries, and find that in forges where there is any escape of sulphur vapor the galvanized iron does not stand well, but that under all ordinary circumstances it has the merit of great durability in addition to its other good qualities.

Safety Apparatus in Foul Air.

M. Galibert, of Paris, has invented an apparatus to enable persons to enter, without danger of suffocation, places where choke-damp or foul air may exist; and its simplicity and ingenuity demand for the inventor a hearing. M. Galibert's invention has been extensively approved and adopted; it has been reported upon the Societe d'Encouragement of Paris, and by the engineer-in-chief of the School of Mines; and it is in use in the municipal service of Paris, in the Spanish mines of the Credit Mobilier, the mines of Douchy, by the Parisian Gas Company, and many other establishments. The other day, M. Galibert, armed with his apparatus, descended into a cellar filled with the fumes of burnt resinous substances, at the barracks of the Pompeurs, in the Rue de Chateau d'Eau, in the presence of General Uhrich, and all the officers of the corps, and remained there a considerable time, without exhibiting the slightest symptoms of suffering. One of M. Galibert' arrangements is intended for use at short distances only from the outer air. It consists of a mouthpiece of horn, ivory, or wood, pierced in two places for two india-rubber tubes, of the length required by the circumstances, fitted to the mouthpieces above mentioned, and provided within with spirals of metallic wire, to prevent collapse, and of a small instrument to nip the nose, and prevent respiration through that organ. The mouthpiece is provided with a projection which is held between the teeth; the lips close around and exclude the surrounding air, and the operator draws fresh air through one tube, while he exhales that used by the lungs through the other. The tongue performs the part of a valve covering the two holes in the mouthpiece alternately; and it is said after a few seconds the action becomes perfectly easy and natural. Where the distance is at all considerable, and consequently the drag of the tubes considerable, the mouthpiece may be held in its place by means of a band; and, in the case of the presence of gases irritating to the eyes, a hood with glass in front is to be added. The other apparatus is for use in places further removed from the open air. In this the tubes are replaced by an air-bag carried by the operator. The same mouth and nose pieces are used, and short tubes communicate with the bag, which is fixed on the back by means of braces or straps; the latter is made in the form of a Spanish wine-skin, and contains when inflated about seventeen gallons of air; one end of the aspiration tube is connected with the lower part of the air-bag, and that of the respiration tube with the upper end of the bag, so that while the warm air from the lungs occupies the upper portion of the bag, the diver, as he may be called, draws fresh air from the bottom. The inventor says that such a bag will suffice for a man's respiration for half-an-hour, the same air passing without danger several times through the lungs. In cases where the duty to be performed occupies a longer time, the operator is provided with extra bags, to take the place of those which are exhausted, or with a second apparatus; and in certain cases these may be drawn out and replaced by others from without. The apparatus is also mentioned as available in cases where medical men recommend total immersion, as a patient could with it breathe freely from the bottom of a bath.—*Journal of the Society of Arts.*

RECENT ENGLISH PATENTS.

A foreign cotemporary—the *Steam Shipping Journal*—has a list of new inventions, from which we extract the following:—

Slide Valves.—In constructing slide valves according to this invention, they are arranged in such manner that, for the latter portion of the stroke of the piston, the ports leading to the two ends of the cylinder shall be both closed by the valve, by which means the interior of the cylinder is shut off both from the steam from the boiler and also from the exhaust or condenser. When the piston arrives at the end of the effective portion of its stroke, both of the ports commence to be uncovered, so that one end of the cylinder communicates with the steam from the boiler, and the other with the condenser or exhaust; both ports then continue open for a portion of the return stroke of the piston; they are then again nearly simultaneously closed, and remain so until the piston has again almost arrived at the end of its stroke, when they both commence to open as before.

Coating or Sheathing Iron Ships.—For the purposes of this invention, when coating or sheathing an iron ship the patentee cleans the ship's side as if for the application of one of the preservative compositions now commonly employed, and puts on a thick coating of tar, or it may be other similar material, but he prefers gas tar. Over this he places thick and coarse paper saturated in oil. He uses, by preference, boiled oil, and tars again over the paper. He attaches wood (commonly pine, or it may be oak or other wood of a suitable thickness) to the ship's side with iron or metal screws, washers being placed under the heads of the screws. The screws enter holes drilled and tapped in the ship's side, so as to firmly fix the wood. The heads of the screws are sunk below the surface of the wood, and the holes are filled up over them with wooden plugs driven in so as to make a flush surface; over the wood tar is again applied, and over that thick coarse paper, saturated with oil as before. The sheathing metal is laid on over all, and nailed to the wood in the ordinary way as when sheathing a wooden ship. All the edges of the wooden planking are bevelled, and they are made to fit the one to the other accurately, and are made tight with red and white lead and tar.

Generating and Applying Motive Power.—This invention relates, principally, to where the elastic force of gaseous fluids generated or augmented by the application of heat is the motive power employed. The mode the patentee adopts of generating and applying such motive power may be illustrated by its application in the case of steam; here he generates the steam from a comparatively small quantity of water or other fluid, either in a boiler or directly in a cylinder fitted with a piston or plunger, against which piston or plunger it is allowed to act. This piston or plunger is caused to work steam tight in the said cylinder by a packing, similar in principle to that used for packing the ram of a hydraulic press, only metal is substituted for the leather there employed. This piston or plunger is so connected with another piston or plunger, adapted to work in a similar cylinder to the first, that if it move outward from its cylinder it will cause the second piston or plunger to move inward into its cylinder, and expel whatever it contains. This second cylinder is filled with oil or other liquid, and its interior, containing the oil or other liquid is connected by a pipe with a third cylinder of smaller capacity, which is also fitted with a piston or plunger, which piston or plunger is connected with whatever machinery is to be put in motion by the motive power. The piston or plunger of this third cylinder is maintained in operation, giving motion to whatever is required to be moved by the engines by means of the oil or other liquid expelled from the second cylinder by the piston or plunger in the said second cylinder. When the pistons or plungers in the first and second cylinders have completed their stroke, a communication is opened with the atmosphere, or a condenser, for the steam in the first cylinder to escape, when the pistons or plungers in the first and second cylinders return to their first position. The oil or other liquid is then re-supplied to the one and steam to the other, and the operation recommences, and is so continued.

A Propeller to be driven by a Windmill.—For the purposes of this invention the patentee gives motion

© 1864 SCIENTIFIC AMERICAN, INC.

to the propeller, whether it be a screw or paddle-wheel propeller, by apparatus similar to a windmill. The axis that turns the sails of a windmill turns in suitable bearings, carried by a small table or bed, which is supported at a suitable distance above the upper deck by legs or supports, which, at their bottom, are carried by a double circular ring; this ring is so supported by the deck that it can be turned on its center, and the axis of the windmill so turned in any desired direction. The ring is, for this purpose, provided with cog teeth, and is supported by rollers or balls, so that it can be turned in like manner to a turntable. The windmill axis has upon it a break and a crank, which, by a connecting rod gives motion to a shaft, which, by toothed wheels or otherwise, gives motion to the screw or paddle shaft. The connecting rod is provided with a swivel joint intermediate of its length, in order to allow of the axis of the windmill to be turned in any desired direction. Apparatus constructed as above described may either be alone employed for giving motion to the screw or paddle shaft, or it may be employed together with steam power, the screw or paddle shaft having motion so transmitted to it from the steam engine, and from the axis driven by the windmill, that the screw or paddle shaft may either be disconnected from the windmill and driven by the steam engine, or be disconnected from the engine and driven by the windmill. The main object is to enable ordinary vessels to steer a course with any wind, and in steam vessels to save fuel without their losing time when the wind is strong enough to give a speed equal to their speed under steam.

A Railroad Cupboard.

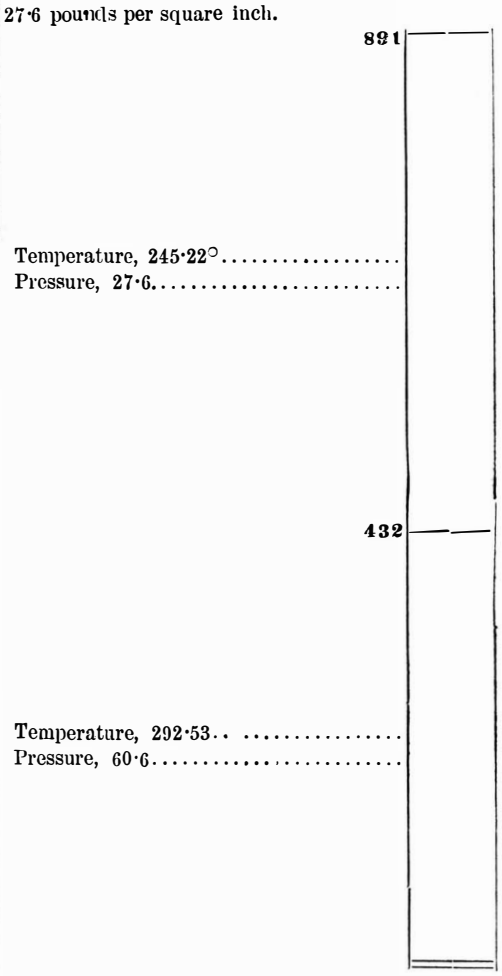
The traveler by rail has frequent occasion to exclaim against the extortion and impositions, both in price and quality of the food at depot restaurants. If we add to this the annoyance of being forced to leave one's dinner smoking hot (after paying for it) to jump into the already moving train, it will be seen that there is need of some such article as the one described below. It is the invention of a member of the "Oneida Community," and is thus described by the *Circular*, organ of said community. It was made for private use:—

"In external appearance the 'cupboard' resembles a common leather traveling-bag. You unlock it, perhaps expecting to find it filled with clothes or books, but find a variety of fruits—apples, pears, peaches, etc., although it may be used for any purpose you choose. On examination you find this apartment extends only about eight inches in depth. You turn it over to find an opening into the remainder of the bag, and finally discover a key-hole in the bottom: unlocking it, a lid may be thrown back, forming a table sufficiently large for all practical purposes. The lower portion of the cupboard thus revealed, contains nine compartments, formed of square and oblong tin boxes, which may be taken out at pleasure. If prepared for a journey, these boxes may be supposed to respectively contain bread and butter, crackers, grapes, cold, chicken, boiled eggs, a bottle of ice-water or wine, tumbler, knives, spoons, etc. Each kind of food is thus kept entirely distinct from any other kind, is easily accessible, and in the same attractive condition as when placed on your home dining-table. The boxes may be cleansed at any time, and thus the whole establishment kept neat and clean. With this cupboard in hand, you may start on a journey of a few hundred miles with the assurance of satisfactory meals when you want them—may eat your meal, on the cars as well as at home, in peace and thanksgiving.

"The lower portion of this satchel-cupboard is made of thin boards, covered with leather—the upper portion of leather only. The former measures on the inside sixteen and one-fourth inches, by ten and one-fourth, and is four inches deep. It is not at all cumbersome to carry in hand, and yet has abundantly supplied five persons with rations on a journey of three hundred miles. Though the cupboard may be entirely used for the purpose of carrying rations, when occasion requires, yet it was the design of the originator to have the lower portion only used for this purpose, and to have the upper portion used for carrying articles of wearing apparel, etc.; and he would now suggest that in duplicating the cupboard the ration-apartment may be somewhat circumscribed, leaving more room for clothing, books, etc., and thus making a complete traveling companion. I have never seen anything of the kind before, and so venture thus to commend it to the traveling public. The writer adds that this article was very popular wherever it was shown."

TH THEORY OF EXPANSION.

We published last week a corrected table of the first approximate results obtained by Fairbairn and Tate in their experiments undertaken to determine the density of steam when formed at different temperatures, and on another page of this number will be found a more extended table of the final results from their repeated and careful observations. From the extreme delicacy of the apparatus employed and from the high reputation of the experimenters, these results will be universally accepted as entirely reliable. If a cubic inch of water is placed in vacuo in a vessel of 432 inches capacity, it will all be converted into steam at a temperature of 292·53° Fah., and the steam will exert a pressure against each square inch of the walls of the vessel equal to 60·6 pounds. Again, if a cubic inch of water is placed in a vessel of 891 cubic inches capacity, it will all be evaporated at a temperature of 245·22°, and the pressure will be 27·6 pounds per square inch.



Now the question is, if we form steam at the higher pressure, so that a cubic inch of water will fill a vessel of 432 cubic inches, and allow this steam to expand to a volume of 891 cubic inches, what will be the pressure? There is no doubt that if we bring the fluid to the temperature of saturated steam at this relative volume, 245·22°, we shall have the corresponding pressure of 27·6 pounds per square inch.

But the question is, *what will be the temperature and pressure if the steam is allowed to expand with only the heat that it contains?*

If this question could be answered we should have a theory of expansion. But there are difficulties in the way of determining the point which would seem to be insurmountable. They baffled the genius of Regnault, and have not been overcome by any other experimenter. If the attempt is made to *measure* the temperature and pressure of the expanded steam, it is necessary to confine the steam in a close vessel, and then it is impossible to prevent it from either absorbing heat from the walls of the vessel, or imparting heat to them.

No practical mode having been discovered of measuring the pressure of expanded steam, various attempts have been made to arrive at it by reasoning from facts that can be observed. Regnault ascertained that water in being changed into steam at the atmospheric pressure, or at a temperature of 212°, absorbs and renders latent 966·6° of heat, while in being evaporated at 339° it absorbs 877·3°. If we take a pound of water each degree will represent a unit, and we have,

	Units of latent heat.	Total heat.
1 pound of steam at 212°	966·6	1178·6
1 pound of steam at 339°	877·3	1216·8
Differences.....127°	89·3	38·2

Steam at a temperature of 339° exerts a pressure of about 101 pounds per inch, and at 212° of about 15 pounds per inch. As a pound of steam at 339° contains 38·2 units of heat more than a pound at 212°, we should suppose that in allowing it to expand down to 15 pounds' pressure, we should have not only sufficient heat to keep it all in a state of vapor, but a surplus of 38·2 units, so that the steam would be superheated, and its pressure would be more than 15 pounds to the inch; provided always that no heat is consumed in the performance of work.

Isherwood, in his Engineering Precedents, Vol. 11, argues that instead of being superheated, a portion of the steam would be condensed. He says the condensation "results from the fact, that although the total heat of steam of higher pressure is greater than the total heat of steam of lower pressure, yet as the latent heat of the latter increases in a much higher ratio than its total heat diminishes, and as this increase in the latent heat is at the expense of the sensible heat, it becomes a cooling process, and produces the condensation stated." In a later work, Experimental Researches in Steam Engineering, Mr. Isherwood argues the point at much greater length, and comes to the same conclusion.

Though we have the greatest respect for Mr. Isherwood's opinions, especially in questions relating to the expansion of steam, we are unable to see how the inference in this case follows from the premises. Though the temperature of the steam would be reduced, yet as the boiling point would be reduced by the diminution of the pressure still more, we cannot understand why there should be any condensation.

Tyndal, on the other hand, argues that expansion where no work is done is not a cooling process, believing this to be demonstrated by an experiment of Guy Lusac's. Two air-tight vessels were connected by a pipe which had a stop-cock in the middle. One vessel was filled with compressed air, and the other was exhausted. On opening the stop-cock and allowing the compressed air to expand so as to fill both vessels, the temperature was reduced in the vessels from which the air passed, but it was raised to precisely the same extent in the other vessels; so that on the restoration of the equilibrium no change of temperature had resulted from expansion.

If this law applies to steam, on expanding a pound of steam formed at 339° to the volume of a pound formed at 212°, it would be superheated not merely by the addition of 38·2 units, but to the temperature of 339°, and it would have a corresponding pressure

Professor William John Macquorn Rankine, in his learned work on the steam engine, seems to consider the varying pressure in the cylinder of a steam engine as measured by the indicator the best data yet obtained for determining the law of expansion. Prof. Rankine would probably appreciate more fully than any other person the entire unsuitableness of a steam cylinder as an instrument for measuring the diminishing pressure of expanding steam. The very frequent exposure of the interior of the cylinder to a temperature far below that of the steam, would not merely modify the pressure, it would so completely change it as to utterly destroy the value of this apparatus as an instrument for making this measure ment.

The theory of expansion in its present condition seems to be merely a collection of conflicting speculations.

CANCELLED STAMPS.—The Deputy Commissioner in the Internal Revenue Department, says, in answer to an inquiry, that stamps which may have been cancelled by mistake or otherwise, without having been used, can be exchanged by sending them to the office of Internal Revenue. But, if dated and cancelled for one instrument, they cannot be removed and affixed to another instrument, although the former instrument may not have been used.

© 1864 SCIENTIFIC AMERICAN, INC.

Petroleum as a Fuel.

A correspondent of the English *Oil Trade Review* writes to that journal as follows on this interesting subject :—

"Being engaged in perfecting a method for burning petroleum as steam fuel on a very simple principle, using for the purpose an extremely small apparatus, for which I have taken out both English and foreign patents, I read carefully over the late articles that have appeared in your paper relative to the subject.

"The impression gained from them, especially that of the 6th August, is, that it was our common coal that was used against petroleum, by the commission appointed by the American Government to examine and report on the subject, and likewise by Professor Fisher, of Newhaven, and that 198 gallons of the oil were found to have only the same heating powers as 2,000 lbs. of coal. Premising that I believe the processes upon which the experiments were made wasted half the oil, it was not our common coal that was used, but anthracite coal, one akin to petroleum. Its effect as a fuel is the rapid production of an intense heat, confined to a surface not extending more than a few inches above the bars, and acting in that way, is, I believe, much more powerful than the English coal. It is commonly used in New York; the Americans understand it, we do not. The price of the Welsh anthracite coal is £1 7s. per tun in London, and that is not so good as the American.

"Professor Fisher's experiments were carried out only on a small scale. To fully settle the comparative value of the oil against coal, an oil-burning apparatus should be kept in full operation for eight or ten hours, under the boiler of an engine of at least six-horse power.

"The statement relative to the *Persia* steam vessel is to be found in the report of the American commissioners. Now, our cousins are very 'cute calculators. I should long hesitate to put aside as worthless anything they brought forward on such a subject, especially if it was with the sanction of the head engineer of the American Navy. But admitting that for all common purposes the present price of petroleum renders it incapable of competing with coal as steam-fuel, there are many items which add to the price of coal for a great ocean steamer which must be taken into consideration. The first price here is a very small part of the matter. It is a subject of great importance, and should not lightly be slurred over. The yearly yield, or take, from our coal-fields is 90,000,000 tuns. The exportation of coals from this country amounted in 1862 to 7,671,670 tuns. Of this quantity, probably £100,000 worth were sent by our Government alone for the use of the steamships in China and the India seas. Our great steamship companies send their portion. There is the expense of carriage, the establishing and keeping up coaling stations, offices, clerks, servants, *et genus omne*.

"The oil is more distributed throughout the world than coal. There are stations where the prices of oil and coal are reversed, the oil being the cheapest. There are large ocean tracts where coal cannot be procured at all, but where probably oil abounds, where our steamers at present are never seen—at least, they are certainly able to supply themselves from the cheapest market, without depending upon England for the supply. Against coal must be placed the army of stokers required, the injury done the engines, the waste of fuel in the heavy smoke, and the great space lost for merchandize by the size of the coal bunkers. On the sea, the great, the open sea, what is the position of steam at present? Why, it is an auxiliary to sails merely. The fires are lighted when there is no wind. As soon as a favorable breeze springs up, they are extinguished, so bulky, and therefore so costly, are the coals.

"All this must be considered when we calculate the expense of coals for steam navigation, but there is something more. If steam was the principal, and sails the auxiliary, a ship could leave England with a rig at present seen only on vessels navigating along our own coast. There would be nearly the whole expense of masts, sails, rigging, etc., saved; there would be fewer shipwrecks, no men lost off the yards while furling sails in tempestuous weather; fewer sailors engaged in each ship, but more vessels sent to sea. On our men-of-war the chief duty of our sailors would be to attend to their guns, no longer the mild weapons of former times. Ships could make short direct passages without turning aside for fuel, time would be saved and labor, more costly than the most expensive fuel, reduced in cost.

"I firmly believe that petroleum will be the means of thus fully developing steam navigation. It certainly is the proper steam fuel. It can be kept in one constant flame, without slack, the heat taken to the boiler, the grate kept cool, an excess of oxygen admitted between the bars.

"The apparatus I wish to introduce is in the form of a movable grate, that could be wheeled under any engine, the coal grate being temporarily removed, enabling the engine to burn either coal or petroleum, as desired; the latter without waste, and so completely under command that, if there were a dozen furnaces on board a ship, all the grates could be supplied with oil at one operation by the engineer, sitting at his table away from the engine room. It would burn its own smoke, and heat the feed-water for the engine.

"To prevent the too quick exhaustion of our coal fields, by any means, would be effecting a national service. Projectors endeavoring to use petroleum for the purpose should not be told "that its introduction as a fuel is one of the wildest dreams that was ever conceived." It is not so. Parties who look to the use of petroleum as fuel should have souls above calculating the results for a Gravesend packet. They should take enlarged views, and they may rest assured that, however large such views may be, petroleum will be found fully capable of meeting them.

THE DENSITY OF STEAM.

On page 380, Vol. I., (New Series) of the Scientific American, we published Mr. Fairbairn's paper giving an account of his experiments to ascertain the density of steam when formed at various pressures. In that paper Mr. Fairbairn gave some of the first results, stating, however, that they were merely approximate, and promising to give at some future time the figures from his repeated observation. In his Information for Engineers he gives the final results in the following table. It will be seen that the observations commence far below the atmospheric pressure, and extend to 45 pounds above. The total pressure is stated—not the amount either above or below the atmosphere—and a line divides those above from those below the atmospheric pressure. Fairbairn calls the number of times which the volume of steam is greater than the volume of water from which it was formed, "the specific volume."

Pressure in lbs. per square inch.	Temperature Fah. °	Specific volume.
2·6	136·77	8266
4·3	155·33	5326
4·7	159·36	4914
6·2	170·92	3717
6·3	171·48	3710
6·8	174.92	3433
8·0	182·30	3046
9·1	188·30	2620
11·3	198.78	2146
26·5	242·90	941
27·4	244·82	906
27·6	244·22	891
33·1	255·50	758
37·8	263·14	648
40·3	267·21	634
41·7	269·20	604
45·7	274·76	583
49·4	279·42	514
51·7	282·58	496
55·9	287·25	457
56·7	288·25	448
60·6	292·53	432

From these results Mr. Fairbairn gives the following formula for calculating the density of steam:—

V=the specific volume.

P=the pressure in inches of mercury.

$$V = 25{\cdot}62 \frac{49513}{P + {\cdot}72}$$

Use for Woolen Rags.—Save all your woolen rags, for you will find a sale for them. The Brunswick *Telegraph* says parties are about manufacturing batting from woolen and cotton rags, carded into sheets, and prepared for the market in rolls like the usual cotton batting. The manufacture will be commenced in Waterville.—*Portland Price Current*.

[Batting made from woolen rags is very poor stuff. This is the celebrated "shoddy." When put into coats or garments it falls to pieces, and the wearer has the satisfaction of seeing it deposited in a huge roll at the bottom of the lining.—Eds.

Steamboat Racing in England.

The *Artizan* gives this account of a set race between two steamers:—"On the 20th ult., by special arrangement, a trial of speed took place from Holyhead to Kingstown, between the mail steamer *Ulster*, and the *Banshee*, a vessel built by Messrs. Aitken and Mansell, of Glasgow, for the purpose of running the blockade. The *Ulster* left the harbor of Holyhead two boats' lengths ahead of the *Banshee*, which followed her out at 2:30 p. m. In ten minutes after this the *Banshee* came alongside her opponent, and, notwithstanding some loss of time occasioned by heated bearings, she reached Kingstown 15 minutes before her, making the passage from the harbor wall to Kingstown in 3 hours 25 minutes, or at an average speed of over 18 statute miles per hour, and carrying 280 tuns of dead weight. The *Banshee* is built of steel; she is 1,190 tuns B. M., and is propelled by paddles driven by engines of 250 horse-power."

MISCELLANEOUS SUMMARY.

A curiosity.—The editor of the *Banner*, Greencastle, Mass., says he found a curiosity in a printing office at Gosport. One of the gentlemen connected with the establishment is a blind man, and sets up types remarkably well. He is the first blind printer he ever came across. He stated to him that his average day's work was 5,000 ems, and that on several occasions he set from 7,000 to 9,000. His letter is distributed for him, and his copy read by his partner, his memory being so perfect that he can retain from four to six lines; when this is finished, he cries at the last word "set," when another sentence is read, and thus continues on during the day.

A very curious method of reducing the intense head-ache experienced by fever patients has been lately pointed out by M. Guyon. It consists simply in pressure extended over the integument covering the temporal arteries. It was discovered quite accidentally in feeling the temples, rather than the wrists, in order to ascertain the frequency of the pulse. Whilst the physician compressed the vessel, the patient exclaimed, "*Comme vous me soulagez*," and thus indicated the result produced by diminishing the supply of blood to the surface of the cranium.

Lord de Grey, of England, has issued advertisements requesting gun-makers to communicate with him on the best means of converting the Enfield into a breech-loader, the expense not to exceed £1 a gun.

[If Lord de Grey would communicate with American gun-makers he would obtain many plans for the purpose. In about a half century our Lord de Greys will awaken to the importance of the subject.—Eds.

A company in London has bought one hundred and forty acres a few miles from the city, and propose to enclose it with glass, making a climate like that of Madeira, with the fruits and foliage to be found in that isle. A hotel and residences are to be built, and great prices will be charged for a chance to live under glass.

The petroleum produced in the State of Pennsylvania was sold at the wells for $56,000,000 during the last twelve months, and the iron and coal of Pennsylvania only produced $51,000,000. In Philadelphia, the daily sales of petroleum stocks at the regular stock exchange board are over $200,000. The number of petroleum companies organized is about 150, and in New York about 80.

Gold Test.—A good test for gold or silver is a piece of lunar caustic, fixed with a pointed piece of wood. Slightly wet the metal to be tested, and rub it gently with the caustic. If gold or silver, the mark will be faint; but if an inferior metal, it will be quite black. Jewellers who purchase old gold often use this test.

In the garden of A. A. Nicholson, Esq., of Brandon Village, Vt., may be seen an unusaal grape exhibition. It is a young Adirondac vine, upon which ripe, full-grown, green, half-grown, newly set fruit and fresh blossoms, are all intermingled upon the same vine.

"The Foot-warmer," advertised in this number, by Solomon Hunt, is an excellent article and in the hands of an enterprising manufacturer ought to command a ready sale.

© 1864 SCIENTIFIC AMERICAN, INC.

Correspondence

The True Plan for a Flying Machine.

MESSRS. EDITORS:—Heretofore all efforts to navigate the air have failed. True, balloon ascensions have been made, but that is not what is wanted. We need a machine or craft that can be guided at will, even as the birds fly. Let none despair, for it can be done, and with safety; for the steam-engine, as we now have it, is able to exert double the power, in proportion to its weight, that any of the feathered tribe can; and all know that an eagle will rise and soar away with an additional weight equal to its own. An eagle will spread about one square foot of wing for every four or five lbs. of its weight. As there is no fulcrum to act against but the weight of the body, it is evident that the wings can not be forced down with any more power than would lift the body, and as the motion is reciprocating, and no labor is done by the upward motion, it is equally evident that there can not be exerted more than half of the weight on an average. As any large bird will fly moving the wing half of the time, it is plain that such birds fly by exerting a mechanical force equal to a continuous pressure of one-fourth the weight of the body. The whole secret lies in the shape of the wing, and its arrangement. When the same principles that are now so well understood in water navigation are as scientifically applied to aerial navigation, by those having the facilities and funds to build and test a suitable machine, the result will astonish the world. But let none attempt to try even a model with one pair of wings, for they will fail; but rather use two, or some even number, and connect the first pair with the next, so that when one descends the other ascends; then the strain or weight hanging upon the wing is balanced, and if moved slowly they move easily, but would press heavily if moved quickly. Let the shape be as nearly as possible that of a turkey's wing, and of such size that the whole will spread about one square foot to every three or four lbs. of weight to be borne. See that the most of the weight is below the fulcrum of the wing far enough to keep the machine from upsetting. Such a machine will be sustained with much less power than is generally supposed, as I have tested.

Any person that ever saw a flock of turkey buzzards on a frosty morning will remember their "slow and easy" motion, and that it is easy to approach very near to them at such times. Some years ago I lived in the Shenandoah Valley of Virginia, near a noted roosting place, and observing these birds' extreme slowness of action, I thought it a good opportunity to ascertain some of the principles involved in flying. I tried to ascertain the set of their wings for different lines of flight. Of course it was impossible to be perfectly exact, but for a horizontal flight the front edge would be elevated above the back edge, and I tried to get the elevation with a quadrant. I had some good opportunities, and made it about ten degrees. From close observation and comparison I think that the wings of other large birds do not vary much from the same angle. I also ascertained that the motion or stroke of the wing was always at right angles to the line of elevation, thus proving that birds do not fly by pushing the wing back against the air, as is generally supposed, but purely by the glance of the wing which is always forward, upon the principle that a ship goes forward when the wind blows from one side. Let none attempt aerial navigation unless they thoroughly understand the principles of sailing a ship against the wind, for upon the same principle the whole is based; and the wing is really a horizontal sail, that makes its own wind by beating the air. If some of your readers who have the time and facilities will take accurate measurement of the wings and tails of different large birds, especially of those that move slowly and strongly, as the eagle tribe, the goose, Guinea fowl, crow, also the exact weight, the concave of the wing, with such other items as may suggest themselves, and let all be combined in your valuable columns, we shall then be in condition to figure up what must be done in order to fly by machinery. Hoping that this will draw the pen of some more able person, I am yours, etc., JAMES E. GILLESPIE.

Pawtucket, R. I., Sept. 2, 1864.

[In a personal interview with Mr. Gillespie we were much impressed with the reasonableness of his original views. He has gone the right way to work. As nature has reduced flying to a practical art, with sound judgment he turned his attention to the study of her wise and successful arrangements. The fact that a bird's wing is set with the forward edge about ten degrees higher than the rear edge he ascertained by instrumental observation, and, so far as we are aware, this is a new and valuable contribution to the knowledge of the subject. We should like to see it verified by other observers. The statement that the stroke of the wing is perpendicular to its plane, it would be still more interesting to have confirmed. The fact that nature does not employ rotary fans in flying is not conclusive proof that this is not the best arrangement. The continuity of the blood-vessels and other ducts precludes the use of rotary motions in the organs of living beings, and these motions are never employed in the world. Still it may be that the reciprocating motion of wings is the true plan for flying.—EDS.

Hyperbolic Logarithms, as used in Calculating the value of Steam Expansion.

MESSRS. EDITORS:—In calculating the theoretical gain by expansion engineers generally make use of the hyperbolic or Napierian logarithms as a simple and accurate method of obtaining the desired result.

Many of those who use this method are unable to see the connection existing between this mathematical table and expanding steam. As our text-books on steam do not appear to make this subject sufficiently clear, perhaps the following explanation may be useful.

The capacity of a steam cylinder with a certain diameter will vary as its length; hence, when steam is allowed to enter freely during a portion of the stroke the quantity of steam used will vary as the portion of the stroke during which the steam has been freely admitted, and the pressure will remain uniform. Now, as soon as steam is cut off from entering the cylinder, and, at the same time, the piston advances, thus enlarging the capacity of the cylinder for that portion of steam which has been already admitted, the pressure of this steam decreases in a corresponding ratio, according to Marriotte's well-known law.

It is desirable to determine this decreasing pressure at every point of the piston's progress, and from this data to estimate the mean pressure during this expansion, in order to calculate the value of expansion.

An arithmetical as well as an ordinate method are each at times employed in obtaining this mean pressure, but it is not to our present purpose to dwell on either of these methods, my object being to show why hyperbolic logerithms are used in calculating the value of steam expansion. It has been observed, that simply by a fortuitous coincidence, the series of numbers so extensively used in mathematical calculations, and known as hyperbolic logarithms, are a series of numbers from which the theoretical mean pressure of steam during expansion can be easily and accurately obtained. We have a series of numbers in this table of logarithms which vary in the same proportion as the laws of nature cause steam pressure to vary when the steam is expanding.

Thus the logarithm of the number representing the ratio of expansion, divided by the length of the stroke through which the steam had been expanded, will represent the mean pressure of the steam during expansion; the pressure and the length of the stroke each being represented by a unit. Then, when we have a number representing the ratio of expansion, or the relative space the steam must fill before the piston reaches the end of the stroke, in comparison with the space filled before expansion; then, by referring to a table of hyperbolic logarithms for the logarithm of this number, and by dividing this logarithm by the number representing the length of the stroke through which the steam was expanding, we will obtain the number representing the mean pressure of steam during expansion.

To ascertain the amount of work done, or the value of expansion, the mean pressure throughout the stroke must be obtained, and, as we have just shown how to obtain the mean pressure during expansion, and as the pressure before expansion is uniform, the calculation becomes very simple.

The object of this article, however, is not to attempt to simplify the practical rule, but only to enable some persons who have not yet seen the reason for the use of this table of logarithms, to understand why it is thus applied.

I trust that it may be evident from the above explanation the use of hyperbolic logarithms for this purpose is as much of an accidental coincidence as if the young engineer should find a twig with knots and marks on it corresponding to the divisions on his two foot rule.

The twig could then be used instead of the rule for measuring purposes, just as a table of hyperbolic logarithms is now used, instead of a regular table, prepared expressly for the purpose of expanding steam. G.

[We are pleased to receive communications with original ideas in them, whether we regard all of the ideas in them as sound or not. We will waive at present all discussion of our correspondent's position, that the relation between the varying pressures of gas expanding in accordance with Mariotte's law and hyperbolic logarithms is accidental; but the question that we ask him is how he knows that steam in expanding follows the Marriotte law? We are aware that this is stated in books, but what we want to know is who has settled it by experiment.—EDS.

The Pitches of Screw Threads.

MESSRS. EDITORS:—I have been a constant reader of your paper for the last ten years, and never attempted to correspond on any subject, being always contented with what others said in your paper. But I think that a great reform can be made in the pitches of screw threads, if a majority of mechanics are awakened to the necessity of the case. I have been building machinery for the last sixteen years, and for the last ten years I have adopted a regular system for common threads which is practically well adapted for work in the western country, or any where else. I make my 1 and $\frac{7}{8}$th bolts 8 threads to the inch, $\frac{3}{4}$ 9, and $\frac{5}{8}$ 10, $\frac{1}{2}$ 12, and $\frac{3}{8}$ 16, and $\frac{1}{4}$ 18; and make the thread half the depth of the pitch. If you can bring about a uniform system for screw threads it will save manufacturers much money, and machinists a great deal of annoyance. I am well aware that some shops cut all kinds of fractional threads, or "bastards," as they are technically termed, in order to prevent their machinery from being repaired in any other but their own shop, but I consider that very short-sighted in a business point of view.

P. T. KISSANE, Machinist.

Sept. 29, 1864.

Feeding Gold Fish.

MESSRS. EDITORS:—Can you through the medium of your paper inform me the mode of feeding and keeping gold fish. I find very great mortality among them, and am convinced it is from improper treatment. J. B.

Cincinnati, Ohio, Sept. 28, 1864.

[We have been told by persons who keep fish that they do not require to be fed, and we have seen it stated by others that gold fish will soon starve to death unless they are properly supplied with food. Perhaps some of our readers who have had experience will answer our correspondent's question. It is possible that he is not aware of the necessity of changing the water frequently. Though $\frac{8}{9}$ths of all water is oxygen, the gills of fishes have not the power of decomposing water and appropriating the oxygen which is chemically combined in its constitution. Their life is sustained by the free oxygen which the water absorbs from the atmosphere, and as soon as this is exhausted the fishes cease to breathe. Hence the necessity of either frequently changing the water, or forcing air into it by an air-pump.—EDS.

Caution in Boiling Clocks.

MESSRS. EDITORS:—I have noticed in your current volume, an easy way of cleaning clocks by boiling them in water. Allow me to add that before doing this all steel springs and tempered bearings should be removed, for if the springs are boiled with the rest, the temper will be reduced and their elasticity

© 1864 SCIENTIFIC AMERICAN, INC.

impaired. One boiling may not injure, but if repeated it will certainly do so. I have seen gun locks destroyed in the same manner, and have been smart enough to spoil one myself. This I should think is sufficient warning to the unwary, who might possibly take a notion to boil clocks and gun locks.

A CONSTANT READER.

Fort Hamilton, Sept. 29, 1864.

[We have great respect for experiments, and seldom if ever reject a communication which gives an account of one. As steel is reduced to a spring temper by plunging it into a bath at a temperature of 550°, it would be surprising to see the temper still further lowered by a bath of boiling water at a temperature of 212°. It would therefore be interesting to have our correspondent's experiments repeated.—EDS.

The Casting of the One Thousand Pounder.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
Washington City, Oct. 5th, 1864.

MESSRS. EDITORS :—I beg leave to correct a slight mistake in your notice of the 20-inch Army gun now at Fort Hamilton, N. Y., in your paper of the first instant.

It is stated therein that this gun was cast under my superintendence, and my official report referred to, as in corroboration ; but as my report actually states, I was only "present" at the casting. The whole operation was performed under the immediate and personal superintendence of Major Rodman himself, the designer of the gun and inventor of the mode of casting : and I was only an interested spectator of the great event.

As it was intended to cast a gun of the same size for the navy, dependent on the success of the army gun, I was directed to be present at the casting, and to report in detail upon it, which I did ; but my "superintendence" went no further.

It is scarcely to be supposed that an operation so important, and which, if successful, was destined to mark an era in ordnance, as well as in the art of gun making, would have been entrusted to the direction of any one but the distinguished inventor himself : and therefore, in justice to him, as well as myself, I have to request that the error may be corrected in your next publication.

R. AULICK,
Lt. Comdr. U. S. N. and Assist. Chief of Bureau.

What it Costs to Sink an Oil Well.

We notice in many of the new oil companies now being formed that the money laid aside for the development of the property rarely exceeds $20,000, while in many instances it does not amount to more than $10,000. That our readers may understand the extent of the development to be expected from a fund of the amount stated we subjoin a statement of what it costs to sink a single well six hundred feet deep, the depth to which it is now found necessary to go to secure success. Here are the items:—

One engine, 10-horse power, delivered on the premises	$2,100 00
Derrick, complete	150 00
Walking beam, samson post, and appurtenances	50 00
Bill wall, band, wheel and belting	150 00
Oversett tools	300 00
1¼ inch hawser and 1¼ inch hand pump rope	150 00
600 feet tubing, at 92 cents	570 00
50 feet driving pipe	250 00
500 bushels coal, at 60 cents	300 00
Two engineers, say 60 days each, at $3	420 00
Contract to drillers, 6 0 feet, at $2 25	1,350 00
One pumping barrel and valves	37 50
Two wrenches, at $10 each	20 00
One clamp	5 00
Two 2-inch gas tongs	15 00
Total	$6,067 50

To this add $500 for contingent expenses, such as accidents in breaking machinery, getting tools fast in wells, and the charges by professional tool extractors, etc., and there will be less than $3,500 left of the $10,000. It will thus be seen that where it is intended to put down a number of wells, as proposed by so many of the new companies, there must be a larger reserve fund, or the stockholders will have to foot the bills.—*Pittsburgh Chronicle.*

Restoration of Violet Color.

A writer in the *Technologist* says :—

"Your readers may probably be interested in the following description of a process for restoring the color to violet silk, after its extraction by acid. It is well-known that spirits of hartshorn will act upon black under similar circumstances, but I am not aware that any chemical agent has hitherto been put forward, as a restorer of violet; and I claim to be the originator of the experiment, with the result of which I am very well pleased. After applying to several chemists and druggists on the subject, and failing to hear of anything that would answer the purpose, it occurred to me to try the "iodine process," which is employed for the purpose of obliterating blots of marking ink from linen; although the process is doubtless well-known to most of your readers, it may be as well to describe the plan adopted :—First, brush with tincture of iodine the portion of fabric affected; after a few seconds well saturate the spot with a solution of hyposulphite of soda, and dry gradually in the air; the color will then be perfectly restored. I should be very glad if any of your correspondents who may try the experiment would give the result through the medium of your columns.

"I should have stated that I was induced to try the experiment described above, in consequence of my knowledge of some of the chemical properties of iodine, and its relation to the color in question: in deed, it is well known that iodine derives its name from the violet vapor which it exhales when volatilized."

Receipt for Making Black Varnish.

A correspondent sends us the following receipt for making varnish, with a request that we should give our opinion of it:—

PATTERN WOOD AND IRON VARNISH.—1 lb. of gum asphaltum, ¼ lb. of gum benzone, put both into a can or jug with 1 gallon of benzole, and let stand until they dissolve, then add 1 pint of linseed oil, and it is ready for use. To have it clear leave out the asphaltum, and for patterns leave out the oil, and to change the color add any color you wish, and mix with the clear varnish. J. CASS & Co., Cincinnati, Ohio.

Lockport, N. Y,, Sept. 13, 1864.

This is a good receipt provided genuine benzole is used; but if what is called benzine in our markets is substituted, it will not succeed. Professor Seely, of this city, was making black varnish in large quantities before the war, by dissolving asphaltum in camphene, and when the supply of spirits of turpentine was cut off by the war, he attempted to find a substitute. He found that benzole was quite as good as camphene, but on trying the most volatile portions of petroleum, the "naptha" or "benzine" as it is popularly called, it would not answer the purpose. Our correspondent will find a full explanation of the difference between benzole and benzine on another page.

How to Test Quicksilver and Detect Adulteration.

Quicksilver, after being extracted by the plain process of retorting, is seldom quite pure, and generally contains a small proportion of other metals. The eminent naturalist Priestly suggests a very simple method to purify mercury, by merely shaking it strongly in an iron flask, and renewing the air in the same repeatedly with a pair of bellows. By this manipulation a black powder will be formed on the surface, which can easily be separated. If no more of this dust is formed the quicksilver may be considered pure. In this state it will always give a clear sound when agitated in the flask, while an admixture of lead will make it sound dull, as if the vessel were made of potter's clay. It is often found in the market wilfully adulterated with lead, tin, and bismuth. Of lead, it can absorb or dissolve almost one-half of its weight, without losing much of its liquidity. This adulteration can easily be discovered by rubbing some of the metal on the open palm; if it soils the skin it is adulterated—if pure it leaves no trace. Besides, if dosed with lead, it will leave a tail behind—*il fait la queue*, to use a French expression—that is, the drops, instead of being globular, will assume an elongated form, and a more or less flattened surface. Some of these observations may be, perhaps, useful to the gold miner, as many complaints have latterly been heard about the impurity of the quicksilver sold in the mines, which fact is also proved by the frequent occurrence and admixture of base metal in the amalgam gold, probably in most cases, by artificial means.—*San Francisco Mining and Scientific Press.*

Another Question about a Rolling Wheel.

The question in regard to the power required to start a train having excited so much interest, we propound another of a somewhat similar character. When a wheel is rolling along the ground, the upper portion moves more rapidly in relation to the earth than the lower portion, so that the motion of every portion of the wheel except the center goes through a series of changes in velocity during each revolution. This suggests two questions:—

First. Do these changes in the velocity of the several parts have any tendency to check, through the action of inertia, the onward rolling of the wheel?

Second. Do they have any tendency to alter the form of the wheel; and if so, in what way?

FARMERS' CLUB.

The Farmers' Club of the American Institute has commenced its sessions after the summer's vacation. The meetings are held every Tuesday at half-past one P. M., at Room 24, Cooper Institute, under the presidency of Alderman Ely. Though the great mass of the proceedings are adapted only to agricultural papers, we occasionally find items that help to make up that endless variety of interesting matter which we constantly aim to present in the colomns af the SCIENTIFIC AMERICAN.

From the proceedings on the 4th of October we select the following :—

YIELD OF GRAPES TO THE ACRE.

Mr. Robinson:—I regret that Mr. Carpenter is not present, as I have here a letter criticising very sharply his statement that it is possible to raise ten tuns of grapes to the acre. Mr. Carpenter said that ten tuns —20,000 lbs. of grapes might be raised on one acre, and this quantity at 15 cents per lb. would amount to $3,000. This correspondent asks if that is not drawing a long bow. (The speaker then made a calculation of the number of vines that might be grown on an acre, and came to the conclusion that with proper cultivation there was no difficulty in raising ten tuns of grapes.)

Dr. Trimble :—I think, Mr. President, that these large statements are calculated to mislead. It must be remembered that for one perfect crop that we get there are several imperfect.

THE WAY TO RAISE PEARS.

Dr. Ward :—If Dr. Trimble means this remark to apply to the pear I shall dispute its correctness. My pear trees have borne for fifteen years a good crop every year.

Dr. Trimble:—Dr. Ward has had a great deal of experience, and with the thorough care that he takes of his trees, he may always have a good crop, But it is very different with the culture that farmers ordinarily give to their trees. I would ask Dr. Ward how often he has changed his trees?

Dr. Ward:—I have some fancy varieties that have been replaced, but the Duchesse d'Angouleme, the Bartlett, and others that I rely on for my crop, are the same trees that I set 15 years ago.

Dr. Trimble :—How often do you plow the ground?

Dr. Ward :—Every spring. I go through with a light shear plow that stirs the ground about two inches deep, and then I put on the mulch.

Dr. Williams :—What do you use for mulch?

Dr. Ward :—Salt hay or straw. I spread it on two inches deep, so that a man can lie down anywhere in the orchard without soiling his clothes.

Mr. Robinson :—How often do you manure the ground?

Dr. Ward :—Every year; and I think it very important to spread the manure on the surface. I find that if I omit the manuring one year, though the crop is about the same, the fruit is smaller in size.

Colored Flames.

In answer to a correspondent we give the following receipts for making colored flames:—

BLUE FLAME.

Nitre	5 parts.	
Sulphur	2 parts.	
Metallic Antimony	1 part.	Mix together.

RED FLAME.

Dried nitrate of strontia	72 parts.	
Sulphur	20 parts.	
Gunpowder	6 parts.	
Coal dust	2 parts.	Mix.

WHITE FLAME.

Petroleum.

CUTTING IRREGULAR FORMS.—A very valuable machine for this purpose is advertised in our present number.

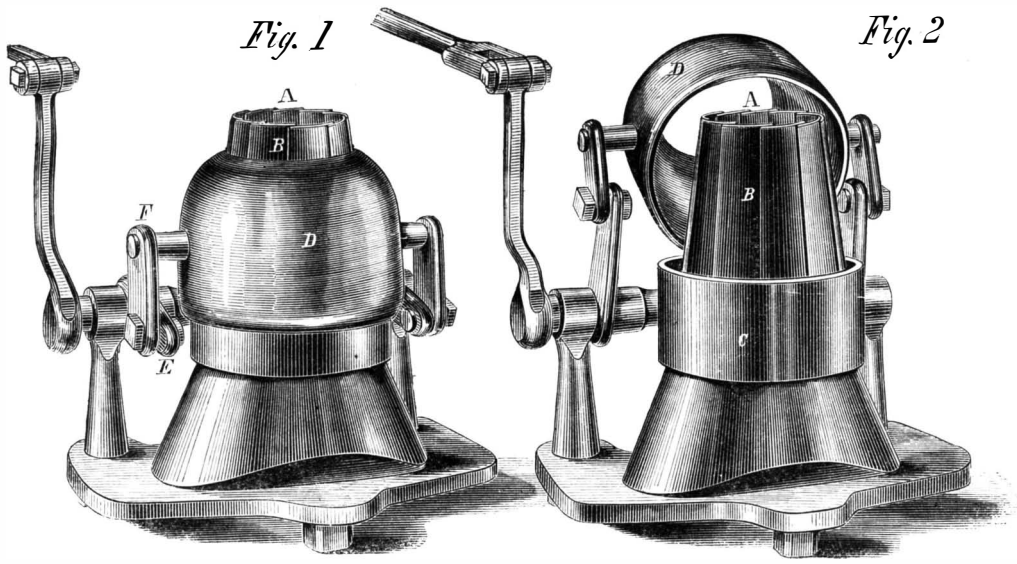
THE quantity of maple sugar returned in Ohio this year amounts to 6,785,178 pounds.

© 1864 SCIENTIFIC AMERICAN, INC.

Improved Variable Exhaust.

A number of ingenious arrangements for adjusting the apertures of exhaust pipes on locomotives have been invented and put in operation, but the one herewith illustrated promises features not heretofore furnished. The object is to contract or expand the mouth of the pipe so as to increase or diminish the force with which the exhaust rushes upward, and thereby directly affect the intensity of the blast, upon which the evaporating power of the boiler depends very greatly.

The device here shown represents a novel and easy working apparatus for the purpose alluded to. Both the exhaust pipes lead into one opening, A, which is composed of a series of thin steel plates, B, lapping over each other at the top and rivetted at the bottom to the case, C. Over these plates the cap, D, is neatly fitted. The levers, E, connect to the arms, F, and when the latter are worked the cap slides up and down on the plates, B. This causes the plates to spring in at the top and narrow the orifice; when the cap is lifted the reverse occurs. In Fig. 2 the cap is shown removed and the plates fully disclosed. This arrangement is intended to be worked from the footboard, or cab of the engine, and the exhaust opening, A, can be changed instantly at will, by merely moving a lever. It is not liable to be clogged by cinders, and has no parts likely to get out of order. This arrangement was patented through the Scientific American Patent Agency on July 12, 1864, by John Dykeman and John Bolton; further information may be had by addressing Mr. Dykeman at Harlem Railroad Machine Shop, Greenbush, N. Y.



DYKEMAN AND BOLTON'S VARIABLE EXHAUST.

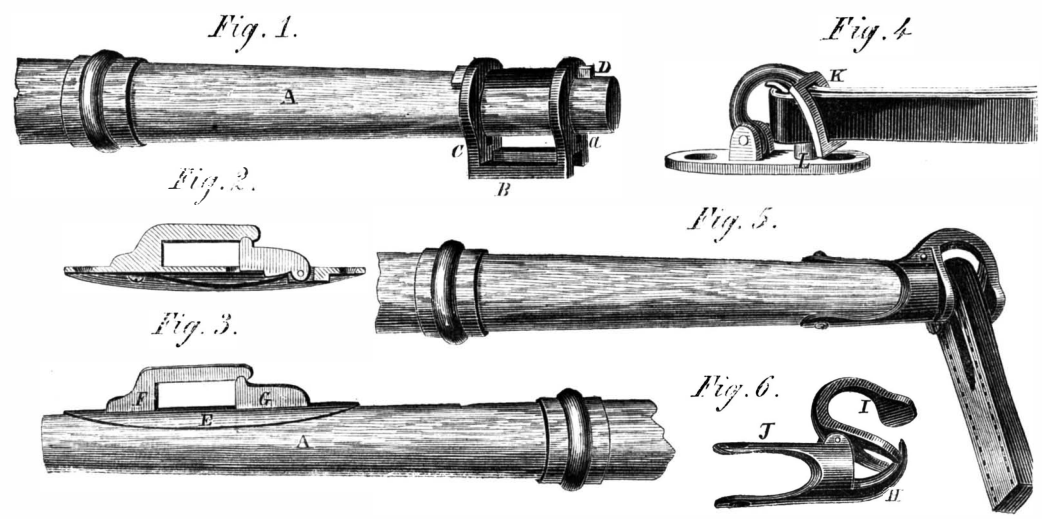
Trace Hook and Hold-back.

Very many serious accidents have been caused by traces slipping off the whiffletrees, or breeching straps slipping out from the hold-back fastenings, or other parts of the harness, which are usually attached by straps, buckles or hooks, of one kind or another, working loose, falling down, and thus frightening the team so that it becomes unmanageable.

In Fig. 1 a new arrangement (which dispenses with the use of buckles on the yoke strap) ordinarily used with a double team, is shown, The yoke, A, is attached to the pole or tongue of the wagon, as usual, but the hold-back straps are buckled round the shank, B, of the stirrup, C, and remain permanently without requiring to be unbuckled whenever the team is unharnessed, as is the case with ordinary harnesses. To get the hold-back straps off, the stirrup is turned round on the yoke until the slot, *a*, in it comes opposite the spur, D; the stirrup then slips over it and is left hanging to the strap. Another arrangement to effect the same object is shown in Figs. 2 and 3, The casting, E, sets in the yoke, and has an arm, F, cast solid on it. There is, in addition, a tongue, G, which has a spring under it (see section Fig. 2) which forces the tongue against the arm before-mentioned. When this tongue is depressed, the strap may be inserted and cannot come out, for the tongue is always pressed upward by the spring below.

These fixtures may be used either for whiffletrees or yokes A trace connection of ingenious design is shown in Figs. 5 and 6. The strap slips over the horn, H, and the link, I, which is hinged to the shank, J, falls down against the end of the horn, as in Fig. 5, and keeps it in place. For a single team the breeching straps are attached to the fixture shown in Fig. 4. This is fastened to the thills as usual, and the strap slips through the square eye, K, and hooks over the horn, L, which keeps the strap securely in position.

These fixtures were patented through the Scientific American Patent Agency, by H. W. Catlin, Burlington, Vt.; for further information address him at that place.



CATLIN'S TRACE HOOK AND HOLD-BACK.

TOMATOES.

Persons who have not learned to like tomatoes are losing one of the great luxuries of life. Like all acquired tastes, the flavor becomes exceedingly attractive, and this esculent adds materially to the pleasures of the table. But it is from its effects that the tomato is most craved by those who are accustomed to its use. It seems to have the property to cause all other food to be assimilated by the system, and gives comfort after dinner even to dispeptics.

The most common way of cooking tomatoes is to stew them. They are scalded with boiling water, which loosens the skin so that they can be readily pealed, the peal is taken off, the fruit is sliced into a saucepan with broken cracker or bread and a little salt, and stewed for twenty or thirty minutes. A better plan is to place the mixture in an earthen dish, and set the dish into a hot oven.

Many persons think that the best way of preparing tomatoes is to pare and slice them cold, and sprinkle them with a little fine loaf sugar, to be eaten raw. Some add salt and vinegar but this is no improvement. For eating cold the tomatoes should be pared without being scalded, as the scalding injures the flavor.

The tomato vine is killed by the slightest frost, but if pulled up before frost comes, and hung under shed fronting the south, the fruit will continue to ripen for weeks.

WEBSTER'S ILLUSTRATED DICTIONARY.

Before the London *Times* had been sold to stockjobbers, and when it possessed some measure of impartiality and fairness, the great "Thunderer" pronounced Webster's Dictionary the best dictionary of the English language ever published. Since that verdict was given the work has increased enormously in extent and value.

We have before us a copy of the edition of 1864, unabridged and illustrated. It is a large quarto volume of 1,768 pages. The title page states that the work has been thoroughly revised, and greatly enlarged and improved, by Chauncey A. Goodrich, D.D., LL.D., and Noah Porter, D.D., both Professers in Yale College. It is published by G. & C. Merriam, State street, Springfield, Mass., and by Bell & Daldy, 186 Fleet street, London.

This ponderous volume is a vast treasury of knowledge. Its principal purpose is, of course, to give the orthography, etymology and signification of all the words in the English language. So large is the number of new words that are constantly being coined in the rapid advance of the sciences, that only a new edition of any dictionary can even claim to have them all. The publishers state that the present edition of Webster contains 114,000 words, which is **10,000 more than any other dictionary.** Besides the full and accurate definitions of these words, the meanings of more than 3,000 are made still more clear by admirable wood engravings. These engravings represent objects in the various departments of natural history, the arms and flags of different nations, figures in heraldry, the various implements employed in gunnery and their several parts, the parapet, scarp, and other portions of fortifications, chemical apparatus, and an endless variety of other matters.

This dictionary also embraces a pronouncing vocabulary of Greek & Latin proper names, an etymological vocabulary of modern geographical name, a pronouncing vocabulary of modern English Christian names, and various other matters. It is an encyclopedia in itself, and will doubtless be in the household of every man who can afford to purchase it.

ELASTICITY OF CAST-IRON CANNON.—We find the following statement in the *Artizan* (London):—"Captain Blakely's 11-inch cast-iron gun, hooped with steel, and which broke one of the hoops under proof a short time ago, having been repaired, has again been proved at the Woolwich butt. The gun is 15 feet long, 43 inches in diameter at the breech, and 20 inches at the muzzle. The gun was fired two rounds, with a charge of 52½ pounds of powder, and a cylinder weighing 540 pounds, and showed no signs of strain or damage. The gun, it is stated, is manuactured to the order of the Russian Government, and will now be despatched to St. Petersburg."

© 1864 SCIENTIFIC AMERICAN, INC.

THE

Scientific American.

MUNN & COMPANY, Editors & Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street New York.

☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.

VOL. XI. NO. 16....[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, OCTOBER 15, 1864.

Contents:

(Illustrations are indicated by an asterisk.)

*Armstrong's Improved Awnings 241
Kerosene Lamp Wicks 241
The Western Reserve 241
How Peat is Obtained 241
American Kid Gloves.—How they are Made 242
Manufacture of Chlorine 242
Protecting Iron from Salt Water 242
Galvanizing Iron 243
Safety Apparatus in Foul Air. 243
Recent English Patents 243
A Railroad Cupboard 244
The Theory of Expansion 244
Cancelled Stamps 244
Petroleum as a Fuel 245
The Density of Steam 245
Use for Woolen Rags 245
Steamboat Racing in England. 245
Miscellaneous Summary 245
The True Plan for a Flying Machine 246
Hyperbolic Logarithms as used in calculating the Value of Steam Expansion 246
The Pitches of Screw Threads. 246
Feeding Gold Fish 246
Caution in Boiling Clocks 246
What it Costs to sink an Oil Well 247
How Pearl is Obtained 247
Restoration of Violet Color .. 247
Receipt for making Black Varnish 247
How to Test Quicksilver and Detect Adulteration 247
Farmer's Club 247
Another Question about a Rolling Wheel 247
*Dykeman and Bolton's Improved Variable Exhaust .. 248
*Catlin's Trace Hook and Holdback 248
Tomatoes 248
Webster's Illustrated Dictionary 248
Elasticity of Cast-iron Cannon 248
Benzine and Benzole 249
The Cooper Institute.—What One Man has Done 249
Brager's Painting of the *Kearsarge* and *Alabama* 249
New English Steam Engine .. 249
A Yankee Pie Factory 250
Recent American Patents 250
Patent Claims 251, 252, 253
Notes and Queries 254
*Moulton's Tide Water Elevator 256
American Invention 256

BENZINE AND BENZOLE.

A New York correspondent, O. H. K., requests us to point out the difference between benzine and benzole.

There are 68 elementary substances at present known, and these combine with each other in various ways to form all of the thousands of substances which exist on this earth. The compound substances are generally entirely different in their properties from the elements which unite to form them. For instance, nitrogen and oxygen are mechanically mingled together to constitute the air we breathe, but if these same elements are chemically combined in certain proportions they become nitric acid, a liquid of such corrosive power that if a single spoonful was introduced into the lungs of any person it would burn them to cinder.

Most of these elements combine together in only a very few proportions. For instance, carbon and oxygen in only two, one atom of carbon combining with one of oxygen to form carbonic oxide, and one atom of carbon combining with two atoms of oxygen to form carbonic acid. It is beyond the power of the chemist's art to induce these two elements to combine chemically without the presence of a third element, in any other proportions but these two. Hydrogen and oxygen also combine in only two proportions. One atom of hydrogen combines with one atom of oxygen to form water; and one atom of hydrogen combines with two atoms of oxygen to form the deutoxide of hydrogen, a sweet liquid wholly unlike water.

But carbon and hydrogen in their combinations with each other stand out as a remarkable exception to the general law. They combine in hundreds of different proportions, forming as many substances, each with its distinct and peculiar properties. There are several series of hydro-carbons, and the series which has been most studied is the coal tar series.

When bituminous coal is subjected to a high heat under shelter from contact with the air, it undergoes destructive distillation; it is decomposed and the elements of which it is constituted enter into new combinations, to form new substances. The kinds of substances formed vary with the temperature at which the destructive distillation takes place. At a bright cherry red are formed the hydro-carbons which mechanically mixed constitute illuminating gas and coal tar. Some of these are so volatile as to retain the gaseous form at ordinary temperatures, and all of the others are condensed in the form of tar by passing the vapors from the retort through cold water. Among the most volatile of the coal-tar hydro-carbons is benzole. This substance has the property of crystalizing at a temperature of 32°, and can therefore be easily separated from the mixture. It is a very volatile liquid, and is a powerful solvent of gums, oils and resins. This property adapts it for use in making varnishes. It is from benzole that the coal tar dyes are made. By treatment with nitric acid and nascent hydrogen, it is converted into aniline, which by oxidation is changed to magenta, solferino, and the others of these brilliant and beautiful colors.

Petroleum consists of hydro-carbons, only two or three of which have yet been separated from the mixture. It has recently been stated in England that a trace of benzole had been found in some specimens of petroleum, but other chemists have been unable to obtain it.

The benzine of our markets at the present time is merely the most volatile portion of petroleum. If it contains any benzole it is only a trace, and not enough to modify its properties. It is doubtless a mixture of various hydro-carbons, and varies in chemical composition and in its properties with the different wells from which it is produced. Its power of dissolving gums and resins is much inferior to that of benzole, and hence its unsuitableness for making varnishes. In the absence of benzole, of course no aniline, and therefore no aniline dyes can be made from it.

THE COOPER INSTITUTE.--WHAT ONE MAN HAS DONE.

Peter Cooper, Esq., of this city, commenced life as a poor boy, and while yet a young man he resolved that if he was ever able he would give to other young men like himself who might desire an education an opportunity of acquiring it. This generous purpose he has held with singular tenacity through many years of toil and saving, and now in his old age he has the exalted satisfaction of seeing the noble day dream of his life accomplished. He erected some years since a great building extending from Third to Fourth avenues and from Seventh to Eighth streets, in this city, and has given it into the hands of trustees to be devoted forever to the instruction of those desiring knowledge, without money and without price.

The building and grounds cost $630,000, more than half we are told of the donor's fortune. The lower story and a portion of the halls are rented, yielding an income of more than $25,000 a-year, which is all appropriated to the support of a magnificent reading-room, to teaching, and to lectures; all being perfectly free to all comers. The lectures on natural philosophy and chemistry are illustrated with costly apparatus, and competent teachers are employed in all departments, including engineering, draughting, sketching, painting, modeling, etc. The number of teachers and professors is 17, and the number of pupils who entered the several classes last year was 1,281. The term of instruction commences on the 1st of October, and now is a good time for any of the young men among our city subscribers to enter their names for a winter's course of instruction. Some of the young men in our office are availing themselves of this unusual opportunity of obtaining an education in engineering, draughting, etc., free of expense to themselves.

THE "CHICKASAW."

We have already stated that the turreted steamer *Chickasaw*, which played so important a part in the fight in Mobile Bay, is not one of Ericsson's Monitors. She was built at St. Louis, by Mr. James B. Eads, from plans designed by himself. The monitors are understood to be vessels designed by Mr. Ericsson, with vertical side armor and an overhanging projection extending beyond the bow and stem, with one propeller, and turrets rotating on the deck. The *Chickasaw* has side armor flaring outwards at about 40 degrees from the vertical; has no long projecting overhang forward or aft; and has four propellers arranged to facilitate maneuvering. She exceeded the speed required by contract (which was 9 knots), and was 6 inches lighter than the contract draught, which was 6 feet. When the latter fact was known her deck plating was doubled by order of the Department, and is now of the same thickness as that on the *Puritan* and *Dictator*, 1½ inches. With this additional plating she draws but 6 feet, and her speed, with this extra burden, exceeds 9 knots. The deck and plating extend aft over the propellers to protect them, but do not touch the water.

The dimensions of this vessel are, extreme length 230 feet, extreme breadth 56 feet, 1,300 tuns measurement. Her propellers are 7 feet 10 inches in diameter; she has 4 engines, with cylinders 26 inches in diameter and 2 feet stroke, and 7 high pressure boilers. She carries 2 turrets, 7½ feet high, with walls 8 inches in thickness, and the base 8 inches below the level of the deck.

BRAGER'S PAINTING OF THE "KEARSARGE AND ALABAMA."

H. Durand Brager is one of the most eminent painters of France, his speciality being the painting of sea views. He has been much employed by the French Government, and during the Russian war was attached to the Admiral's ship with the purpose of making sketches for paintings of naval battles and other incidents connected with the operations at sea.

Mr Brager has executed a painting of the combat between the *Kearsarge* and *Alabama*, which is now on exhibition at Goupil's gallery, corner of Broadway and Ninth street, in this city. In making the painting the artist had the benefit of hints and directions from Captain Winslow, and he has doubtless produced a very correct representation of this immortal scene.

The time selected is just as the *Alabama* began to sink, and before she had lowered her pirate flag. In the fore distance is the *Kearsarge*, a stately man-of-war, presenting her port bow to the spectator and her starboard broadside to her antagonist, which is seen in perspective, her stern slowly settling beneath the waves. The *Kearsarge* is near enough to show the forms and positions of the men upon her, and a prominent group are seen on the forecastle deck training a heavy gun upon the enemy. There is a singular air of coolness and confidence about both the vessel and the crew. The genius of the painter has hit off the attitudes of the men with a touch of his brush, and they seem to be going through their duties with the promptness but deliberation of perfect drill. Though volumes of smoke are rolling from her chimney, there is no dash of spray around the vessel's bows, which rise majestically above the water,

> "And in her look the calm that comes
> From consciousness of strength."

There has been some talk of purchasing the picture and presenting it to Capt. Winslow. The price asked for it is $5,000.

SPECIAL NOTICE.

STANHOPE W. MARSTON, of New York City, has petitioned for the extension of a patent granted to him on Jan. 7, 1851, for an improvement in trigger operating revolving fire-arms.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, Dec. 19, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

New English Steam Engine.

An English Lieutenant has invented a new style of engine which is designed to be exceedingly compact and simple in its details. It is merely a cylinder fitted with a very deep piston. This piston has a cylinder inside of it, running at right angles with the bore of the main cylinder. There are two pistons in this cylinder which connect by rods to a crank shaft running through the large cylinder. The deep piston also connects to this crank shaft, so that when it has made one stroke, carrying the crank shaft part of the stroke, the small cylinders in the main piston act on the crank shaft, and also impel it. The whole engine is no larger than the cylinder; everything being enclosed in it. Steam is used on the smaller cylinders first, and then let into the larger one.

© 1864 SCIENTIFIC AMERICAN, INC.

A YANKEE PIE FACTORY.

He who strolls along the streets of this great metropolis sees pies to the right of him, pies to the left of him, baked and delivered. But to him a pie is a pie, and he never reflects upon the energy, enterprise, and capital required to make pies for the people. When the housewife makes a weekly batch of pies, she has her hands full. What shall be said of the concerns who make, daily, pies for a whole city? Whose calculations are all pie; whose thoughts are on pie; the very end and aim of their existence being to turn out as many pies as possible. One manufacturer in this city makes from 35,000 to 40,000 pies per week—this is Mr. O. Hopkins, of 420 Sixth avenue. He occupies four buildings on the thoroughfare in question, and has ten horses and wagons engaged in delivering his pies about the city.

THE OUTSIDE OF THE PIES.

Everybody knows what the outside of a pie is—it is flour, water and shortening, or butter. These materials are kneaded into a paste, rolled out thin, and spread over the contents of the dish. In Mr. Hopkin's factory one man stands before a mound of paste which he can scarcely see over; this he manipulates and stirs about after the most approved fashion, and hands sundry portions of it over to the rollers that stand beside him. He twists off a modicum about as large as a man's fist, which a busy youth beside him rolls out into a large flapping disk of paste. This disk is unceremoniously tossed over to women opposite, who have pie dishes before them ready filled. The crust is spread neatly over a dish, trimmed off quickly on the edges and passed to the baker. Eight or ten individuals are continually rolling pie-crust, and it is needless to say that in this branch of the business they are exceedingly dexterous. Long practice has made them familiar with it, and they roll as the sea rolls, monotonously and forever.

THE INSIDE OF THE PIE.

We stated that every one knew what the outside of a pie was but few of us know what is inside. In mince pie, for instance, we are pleased to have an intimate personal knowledge of the maker, for there are opportunities in the construction of this pie for the insertion of meats which are not acknowledged articles of diet. Mr. Hopkins's mince pies are made from the best fresh beef, bought daily from a neighbor and cooked and minced under his immediate supervision. The apples are smooth, round, handsome fruit as one could wish to see, and the whole of the operations are carried on with much neatness.

For pies other than mince, the fruit, in the case of pumpkin or apple, is cut up and stewed, and afterwards passed through a collander to reduce it to a fine consistency. Each pie has an equal quantity in it measured by a dipper, and great tubs full of stewed fruit of various kinds stand ready for the fillers. The baker stands before his oven continually putting in or taking out pies, and all day long the pastry is passing through his hands, The city swallows them as the oven disgorges them, and from the furnace mouths to the throats of the populace there is but a brief period. The ovens hold 150 pies at a charge, and as many as 48 ovens' full have been baked daily.

MATERIALS USED.

Of course to the statistician this article would be very incomplete without some figures. Here they are then:—Of flour there are 80 barrels per week used; of beef, 3,000 lbs. per week; in mince-pie season, of lard, 3,500 lbs. per week; of sugar 3,000 lbs.; milk, 2,400 quarts per week. The other supplies, such as fruit, are immense, and are not reckoned by us. There were barrels of apples and pumpkins in one room awaiting their fate, and the piles of peach boxes told plainly of what *had* been and passed away.

The season governs the kind of pie most in demand. Of course, in summer, fruit pies are in request; in the fall, pumpkin and apple; in the winter, mince and dried fruit pies, and so on. Fourteen different kinds are made, and each is numbered in order, so that by looking at the number the customer can tell the kind of pie.

It must be borne in mind that the factory is not the only one of the kind in the city, but it is the largest. We are told that in the several establishments 35,000 pies are made daily. From these figures the reader can form some idea of the enormous consumption of this article of food.

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Supporter for Fractures.—The object of this invention is to relieve a fractured leg of the weight of the body and to enable a person, as soon as he or she is able to hold the foot down, to walk about without crutches, and to follow his or her usual avocations without danger; and to this end it consists in a supporting rod, secured to the upper and lower portions of the limb by suitable clamps, jointed at the knee and furnished at the bottom with a foot-piece to bear on the ground, and at the top with a pad piece which comes under the buttock and supports the body at that point. The great advantage of the supporter is apparent from the following extract from a letter of the inventor, D. H. B. Allen, of Chelsea, Vt.:—"On the 16th of October last my leg was broken; the large bone twice, a piece about three inches long being displaced or driven back at least an inch. The small bone was broken once. I invented and completed the supporter in about twelve weeks; I could have used it much sooner had it been completed. The first week of its use I went up and down a ladder to get hay and grain as usual. About the middle of February you saw me at your office some three hundred miles from home. In March and April I made some 400 lbs. of sugar, wearing the supporter till June. Since then I have had no use for it, and do not even use a cane. My weight, as you saw me was about 223 lbs, my age fifty-one years."

Stone-breaking Device.—This invention relates to a new and improved device for breaking rocks, and is more especially designed for crushing gold-bearing quartz, reducing the same to quite fine particles, like fine sand, so that the latter will be in a favorable condition to be crushed and have the gold separated from it by amalgamation by any approved device or process. The invention consists of a crusher composed of a stationary and a movable or oscillating jaw, the stationary one having a single plane surface and somewhat inclined, and the oscillating jaw, having two plane surfaces, one being above the other with a concave surface between them, the fulcrum pin of the oscillating jaw being in a line central with the concave surface, and all arranged in such a manner that a double-crushing operation is performed by the same pair of jaws, the rock being cracked by one operation and reduced to the fine state by the other. A. W. Hall, of New York city, is the inventor.

Lining for Faucets.—This invention relates to certain improvements in the construction and manufacture of faucets, in which the shell or body is packed or lined with elastic material for the purposes of obviating the necessity of fitting and grinding the plug and producing an article more durable and at a less cost to manufacture than the ordinary faucets constructed to work with metal surfaces in contact with each other, and consists, first, in an improved method of molding or preparing the cork linings with the least possible waste of material, and in such a manner that they can be inserted in the shell of the faucet without boring for the plug or further manipulation. Second, In an improved method of securing the prepared lining in position by casting a longitudinal projection or rib on the inside of the shell of the faucet in such manner that it forms an abutment at the joint of the lining, and prevents it from rotating or moving in a horizontal direction in the line of its circumference, and secures it in position without ribs or projections to indent the cork, or recesses in the wall of the faucet for the cork to fill by expansion or distension, and admits of brass faucets being cast in the ordinary manner of casting plain work, with a round and smooth-surfaced sand core. John Broughton, of No. 41 Center street, New York is the inventor.

Improved Propeller.—The object of this invention is to propel a vessel by the reaction of a stream of water issuing from orifices above the water line. The invention consists in the employment of rotary pumps applied on the sides of the vessel to be propelled, in combination with discharge pipes passing into pipes of a much larger diameter, which take water at the bottom of the vessel and discharge at its sides above the water line in such a manner, that the stream of water issuing from the discharge pipes acts on the principle of an injector, and a volume of water is expelled from the large pipes much exceeding the volume which the pumps alone, unaided by the injectors, would be capable of expelling, and by the reaction of the water thus driven out of said pipes with great velocity, a power is obtained which will propel a vessel or aid in propelling it with a force which is entirely independent of the velocity with which said vessel moves through the water; the invention consists, further, in the employment of pumping cones with spiral flanges in combination with conical barrels open at both ends, and with pipes leading from the small ends of said conical barrels out through the sides of the vessel above the water line, in such a manner that by the action of the spiral flanges a comparatively large quantity of water is gathered up in the large ends of the barrels and forced with great velocity out through the small ends of said barrels and through the discharge pipes, and the vessel is propelled by the reaction of the water issuing from said pipes; the invention consists, finally, in the application of revolving nozzles to the pipes through which the water is expelled, in such a manner that by turning said nozzle the motion of the vessel can be reversed or stopped altogether without reversing or stopping the engine or motive power. Albert Pagenstecher, of Valparaiso, Chili, is the inventor.

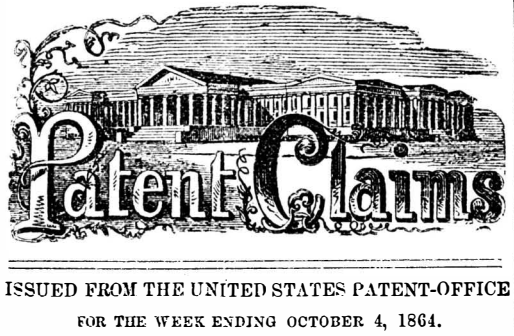
Gag Runner.—This invention consists in the application to a gag receiver of a simple button, in place of the loop generally used to fasten the same, in such a manner that when said button is passed through an appropriate hole in the gag-strap, it retains the gag runner securely in place, and at the same time allows the same to oscillate back and forth and to accommodate itself to the motions of the rein. Walter Greacen, Newark, N. J., is the inventor.

Operating Street Cars.—The object of this invention is to construct a street car so that it will run on a track which is flush with the surface of the street and does not interfere with the travel of ordinary vehicles. The track best suited for this purpose consists of two flat plain side rails and a central rail with a narrow groove to secure the guide-wheels which are brought to the under surface of the platform of the car and connected with a suitable lever and hand-screw or any other equivalent device, in such a manner that the same can readily be depressed into or raised from the central guide-groove. The two levers which form the bearings for the axles of the guide wheels, are hinged to the brake levers, the outer ends of which form the nuts for the hand-screws and said brake levers are connected with each other, or each with the opposite guide-wheel lever, or the two guide-wheel levers may be connected to each other by a suitable joint so that both are compelled to work simultaneously, and the driver at one end of the car is enabled to apply or take off both brakes or to raise and lower both guide-wheels without leaving his stand, and by the action of one and the same hand-screw or other equivalent device. Charles E. Willis, 27 Nassau street, New York City, is the inventor.

Relieving Slide Valves of Friction.—This invention consists in the support of a slide valve in such manner as to remove the pressure and friction as much as practicable from its face and seat, by means of one or more gibs attached to the valve and working on a stationary slide or slides attached to the valve seat or chest, the faces of the said gib or gibs and slide or slides being of harder metal or material than the faces of the valve and seat. It also consists in a mode of lubricating the faces of the said gib or gibs and slide or slides. It further consists in a certain construction of the said gib or gibs, whereby the valve is lifted from or drawn back entirely out of contact with its seat whenever the pressure is shut off and the engine still kept running with the valve face and seat dry, as in the case of a locomotive descending a grade or running into station, and the valve is thereby caused to run without friction. Andrew Buchanan, of Brooklyn, N. Y., is the inventor of the above; the patent bears date Sept. 27, 1864.

VOLUMES III., IV., VII., AND X., (NEW SERIES) complete (bound) may be had at this office and from periodica dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference Subscribers should not fail to preserve their numbers for bindin g VOLS. I., II., V., VI. and VIII. are out of print and cannot be sup plied

© 1864 SCIENTIFIC AMERICAN, INC.



ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING OCTOBER 4, 1864.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

44,497.—Furnace.—James Albee, Boston, Mass.:

I claim, first, The arrangement of the fire-pot, A, the draught tubes, C C, and the cold air recesses, B B, in the peculiar manner described, so as to admit of the whole being cast in one piece.

Second, The peculiar form and arrangement of the internal radiator, E F, the four air ducts, P P P P, and the discharge orifice, F, substantially and for the purpose as herein set forth and described.

44,498.—Bridges.—John J. Aliscs, of New York City:

I claim the arrangement of the trestles, A A, sills, C, or check blocks, C', the transverse connecting and supporting bar, B, and the longitudinal sleepers, D, the whole being adapted for joint use, substantially in the manner and for the purpose set forth.

44,499.—Limb Supporters.—D. Henry B. Allen, of Chelsea, Vt.:

I claim, first, The supporter, composed of a jointed supporting rod, A A', a foot piece, c, two clasps, B B, and a pad piece, C, the whole combined substantially as and for the purpose herein specified.

Second, Combining the pad piece, C, with the upper part A, of the supporting bar, by means of sockets, j j, a screw, j, and a nut, k, substantially as and for the purpose herein specified.

Third, The front brace, D, combined with the upper part, A', of the supporting bar, and with the pad piece, C, substantially as and for the purpose herein specified.

44,500.—Harvesting Machines.—William Allen, of Worcester, Mass.:

I claim the combination the oblique slots, with the shipping handle secured to the shaft, as described, as and for the purpose set forth.

44,501.—Railroad Pumps.—John B. Atwater, of Chicago, Ill.:

First, I claim the cylinders, A and B, connected with the pipe, C, in combination with the piston, D, and box, E, or its equivalent, when constructed and operating substantially as and for the purpose set forth.

Second. In combination with the foregoing, I claim the application of a weight, attached to the upper end of the stem, a, of the piston, D, substantially as and for the purpose herein set forth.

Third, In combination with a piston, weighted as above described, I claim the application of a body or air, between the piston and the water to be elevated, substantially in the manner herein described.

44,502.—Seeding Machine.—C. A. Baldwin and C. Abron, of Independence, Iowa:

We claim, first, The manner of constructing, attaching and operating the discharge spouts, C, when constructed and operated as described.

Second, The bar, G, and its supports, H, when constructed and placed, as and for the purpose described.

Third, The manner of constructing and attaching the cultivators, D, and the mode of raising and lowering them, by means of E and F, as described, in combination with said machine.

Fourth, The combination and arrangement of the said seeding machine, in all its several parts, when constructed and arranged and operating in the manner and for the purposes set forth.

44,503.—Turning Lathes.—Johnathan Ball, of New York City:

I claim, first, The arrangement of two heads, forming two "live centers" for cutting ovals, as herein described.

I also claim the arrangement of the devices of the head, viz., the face plate, Q, with its slide, R, flanges, S, and straps, U, in combination with the adjustable collars, L, as herein described, and for the purposes set forth.

44,504.—Machine for Filing Saws.—N. G. Barnum, of Malaga, N J.:

I claim, in combination with the bed pieces, A A, a divided disk, arranged to traverse on the saw, and constructed as described.

I claim the vibrating or revolving carriage C, turning on the flanges, D D, and carrying the adjustable file carriage.

In combination with the divided disk or bed pieces, A A, I claim the adjustable clamping piece, I, arranged substantially as described.

In combination with the divided disk, I claim the traversing clamping piece, I, operated by a lever and spring, J, substantially as described.

In combination with the divided disk, I claim the lever, M, hook, N, and spring, Q, for raising the apparatus and file from the saw, when it is moved from one notch to another on the saw.

In combination with the divided disk and vibrating frame. I claim the stop pins, E E, which limit the vibration of the frame.

I also claim the guide pieces, R R, on the vibrating frame, and the transverse rod, S, in combination with the clamping arms, T T, which hold the file, substantially as described.

44,505.—Churn.—William Beaton, Grinnell, Iowa:

I claim the employment of an adjustable regulating rod and weight, in combination with the verge, L, as and for the purpose herein shown and described.

I also claim the arrangement of one or more springs, C C, shaft, B, wheel, D, with attached spring ratchet, E F, shaft, I, escapement wheel, J, verge, L, and wheel, K, with the churn, B, end dasher, O, in the manner and for the purpose herein shown and described.

[This invention belongs to that class of churns which is operated by means of spring power through a suitable train of gearing, and it consists in a new and simple arrangement of clock-work devices with those parts of the churn which are to be operated.]

44,506.—Gun Carriages.—George Birkbick, Jr., of New York City:

I claim, as an improvement on the Ericsson gun carriage, the application of a bracket, E, to the rear end of the carriage, so made and applied as to form an elevated bearing for the tail screw, and at the same time strengthen the rear end of the carriage, by transferring a part of the force on the tail screw to the side frames of the carriage.

44,507.—Straw Cutters.—E. F. Bishop, Burton, Ohio:

I claim the connecting rod, I, arm, J, lever, K, gate, G, in combination with the rollers, P P, ratchet wheels, m' n', pawls, m n, arm, L', lever, L'', weighted lever, R, and rods, d d, when arranged and operating conjointly as and for the purpose set forth.

44,508.—Lamp Chimneys.—E. S. Blake, of Pittsburgh, Pa.:

I claim a lamp chimney, having an inside curb, constructed or supported, substantially in the manner and for the purpose set forth.

44,509.—Water Wheels.—E. B. Brooks, Michigan City, Ind.:

m, first, The dome, E, in combination with the wheel, A, horizontal annular plate, D, gates, F, and plates, I, all arranged substantially as herein set forth.

Second, The connecting of the dome, E, to the annular plate, D, by means of the bolts, g, arranged as shown, so as to serve as pintles for the hinges of the gate, F, as described.

Third, The gradually-enlarged buckets, d, from their inner to their outer ends, with concave-inclined bottoms, E, in combination with the chutes, composed of the gates, F, and plates, I, and dome, E, substantially as and for the purpose specified.

44,510.—Flexible-lined Faucets.—John Broughton, of New York City:

I claim, first, The method, substantially as described, of preparing and molding cork lining for faucets, in the form of a frustrum of a cone or other shape, so that they may be inserted and fitted in the interior of the faucet.

Second, The arrangement of the abutment, d, with the open joint of a flexible lining, substantially as described.

Third, The combination of the projection, d, with the body of the faucet and the flexible lining substantially as described.

Fourth, The combination of the flexible lining, secured in the faucet, substantially as described, with the plug, B, or its equivalent.

44,511.—Coach Lamps.—C. B. Brown and E. Andrews, of Placerville, Cal.:

We claim a coach lamp, having its case, A, of conical or flaming form, with a concave back, a, to receive a concave-silvered glass or mirror-reflector, C, and provided with box-like projections, D, at its siders, for glasses, b, to serve as lights, combined substantially as herein set forth.

44,512.—Grain Dryer.—Johnathan S. Buell and Saml. A. W. Marsh, of Buffalo, N. Y.:

We claim, first, The combination with the air chamber, K, of one or more inclined grain-drying or cooling chambers, T, having perforated or open sides, D and E, both of which are inclined in the same direction from a perpendicular line, substantially as and for the purpose set forth.

Second, The combination with each other, with the receiving chest, F, and with the air chamber, K, of two or more inclined grain-drying or cooling chambers, T, having perforated or open sides, substantially as and for the purpose set forth.

Third, Constructing the grain-drying or cooling chambers, T, with perforated or open plates, D, and E, or their equivalent, both inclined in the same direction, but at unequal angles from a perpendicular line, in such manner as to give an inclined space or chamber of gradually-diminishing thickness from the top to the bottom, between the said plates, D and E.

Fourth, The combination and arrangement of the agitators, I, with the perforated plates, D and E, and the grain chamber, F, substantially as and for the purpose set forth.

Fifth, The combination and arrangement of the shafts, N, and gates or valves, O, with the grain chamber, T, the discharging spouts, B, and the conveyor, C, substantially as and for the purpose set forth.

Sixth, The combination and arrangement of the dampers, L, with the perforated plates, substantially as and for the purpose set forth

44,513.—Grain Binders.—W. W. Burson, of Rockford, Ill.:

I claim, first, Hinging fork, b, to shaft, K, in such manner that the fork and shaft shall be on opposite sides of the twine, in position of rest, whereby a loop is formed in the twine by their rotation, as described.

Second, The arrangement of fork, b, and groove, 3, constructed substantially as described and for the purpose set forth.

Third, The combination of the rib, 4, with groove, 3, and fork, b, acting substantially as described.

Fourth, The combination of depresser, i, with fork, b, as set forth.

Fifth, The combination of hook, c, groove, 5, and shaft, K, operating substantially as described.

Sixth, The combination of lever, d, with a tying device, operating substantially as described and for the purpose set forth.

Seventh, The construction and operation of the cutters, l and m, substantially as described.

Eighth, A tying device, constructed and operating substantially as described, whereby the sheaf position of the twine is cut from the spool position before the knot is tied, and whereby the knot is tied without straining upon the sheaf position during the tieing process, for the purpose set forth.

Ninth, The combination of ratchet spool pulley, C', ratchet rod, F, and spool spring, s, substantially as described.

Tenth, The combination of the jointed handle, D D,' and vibrating lever, A, arranged to lock the said lever when it is fully down, substantially as set forth.

44,514.—Vessel for Refrigerating Liquids.—John V. B. Carter and Charles F. Orcutt, of Albany, N. Y.:

We claim, first, A refrigerator which is provided with an internal ice chamber, B', an external liquid chamber or chambers, A', and inlet and discharge pipes, b b', arranged substantially as described.

Second, The arrangement of a pipe, c', within the chamber, A', provided with openings near the bottom and a gas vent near the top, substantially as described.

Third, The combination of the inlet pipe, b, with the internal pipe, c, and external discharge pipe, b', substantially as described.

Fourth, The bracket or shelf, g, arranged in liquid chamber, A' beneath the inlet pipe, b, substantially as described.

Fifth, The conical recessed projections formed on the outer surface of the wall, A', in combination with the flanged tubes or coupling pipes, substantially as described.

Sixth, The combination of the internal ice chamber, B', with a series of liquid chambers arranged around it, each liquid chamber being provided with an inlet pipe and an outlet pipe, substantially in the manner described.

44,515.—Metallic Broom Head.—Orlando Lane Castle, of Upper Alton, Ill.:

I claim, first, The use of a bi-valoular, hinged, metallic sheath, for containing the straw, arranged and operating substantially as set forth.

Second, The combination of the cross bars, C C, with the sheath, A A, and the key, K, applied, arranged and operating substantially as described, for the purpose set forth.

44,516.—Machine for Cutting Sheet Metal.—James N. Cherry, of Zanesville, Ohio:

I claim the cast-iron bars, H, provided with the rotary shears J J', in combination with the carriage, D, placed on ways or guides on the frames, A C, and provided with the gauge, E, and clamp, F, all arranged to operate, substantially as and for the purpose set forth.

I further claim the bar, G, attached to the carriage, D, and provided with the arm, H, substantially as and for the purpose specified.

[This invention relates to a new and improved machine for cutting sheet metal, such as sheet-iron, zinc, copper, etc., for the manufacture of stovepipe, pans, etc. The object of the invention is to obtain a machine for the purpose specified, which will supersede the ordinary hand shears now employed at a considerable expenditure of time and labor.]

44,517.—Composition for Coating Steam Pipes, Boilers etc.—John Chilcott, of Brooklyn, N. Y.: Ante-dated, Sept. 19, 1864:

I claim the non-conducting composition, composed of silica, gypsum and coal-tar pitch, with or without hair, substantially as herein described.

44,518.—Rock and Ore Crushers.—David Dick, of Meadville, Pa.:

I claim, first, The employment in an ore and stone-crushing machine of two rectilineally-reciprocating crushers, vibrating between adjustable side plates, substantially in the manner and for the purpose set forth.

Second, The combination of two sectionally-reciprocating crushers, with cone-shaped sectors and a double-eccentric roller, arranged and operating substantially in the manner and for the purpose set forth.

44,519.—Refining Petroleum and other Oils.—Wm. Porter Downer, of New York City:

I claim, first, The use of a rotary, hermetically-closed vessel for mixing petroleum and other oils with acids.

Second, The use of vanes so placed inside of said vessel, in manner as shown, that by their rotation they first elevate the heavier liquid from the bottom to the top of the lighter liquid, and then when empty, by continuing their rotation, carry with them below the surface of such liquids a body of air, which, by escaping, maintains the desired agitation.

44,520.—Process for Solidifying Peat.—John Elsberg, of New York City:

I claim the process of solidifying peat by the operations of heating, grinding and pressure, substantially as described.

44,521.—Casting Cannon.—A. H. Emery, of New York City. Ante-dated Sept. 24, 1864:

I claim casting cannon with the breech uppermost, as and for the purpose described, and with the hollow core bar or mandrel passing through and projecting beyond both ends of the casting.

Second, In the casting of cannon I claim applying to the hollow cone bar a tensile strain, substantially in the manner and for the purpose described.

Third. I claim the use of the water pipe, L, substantially as and for the purpose set forth.

44,522.—Securing Shoes to Horses' Hoofs.—Wm. H. Forker, Meadsville, Pa.:

I claim the two jaws, B B, provided with flanges, C C, and secured to the upper surface of the horse shoe and connected together, substantially as shown and described, for the purpose of securing the shoe to the foot or hoof, as set forth.

[This invention has for its object the securing of the shoe to the foot or hoof without the use of nails, and at the same time obtain a secure fastening, and one which will admit of the shoe being readily attached to and detached from the hoof.]

44,423.—Churn Power.—Aaron Fuller, Amsterdam, N. Y., and William H. Howe, Port Jackson, N. Y.:

In combination with the frame, H, braces, a a', cog wheels, E F, fly wheel, D, pitman, C, working lever, B, and sash, A, we claim the posts, E I, inclined inwards from one side of the frame, and affording a bearing for the working lever, B, in the center of the said lever and over the center of the machine, when all the parts are arranged in the manner and for the purposes herein specified.

44,524.—Drying Cylinder for drying Paper, Warp Threads, etc.—M. A. Furbush, Philadelphia, Pa.:

I claim a drying cylinder consisting of an exterior cylindrical casing caused to revolve around (but not in contact with) and to derive its heat from an inner cylindrical casing, to which steam is admitted, all substantially as and for the purpose herein set forth.

44,525.—Amalgamator for Gold and Silver.—Perry G. Gardiner, New York City:

I claim, first, The peculiar shape and construction of the rim or cover of the vessel, D, in combination with the basin or body of said vessel, whereby, in connection with the mercury and water as described, the gold or other precious metal becomes amalgamated and falls to the bottom of the basin, while the other parts pass over the sides, the basin being arranged and operated in the manner and for the purposes described.

Second, I claim the combining and arranging the exterior circular trough or vessel, F, with the interior vessel, D, and its arrangements, in the manner and for the purposes described.

Third, I claim the combining and arranging pipe, H, with the central conical portion of the vessel, D, whereby the dust and water entering the vessel, D, are distributed equally over all parts, as described.

Fourth, I claim the form and arrangement of the scraper or rake, 5, within the vessel, D, operating in the manner and for the purpose described.

44,526.—Machine for washing Minerals, etc.—Perry G. Gardiner, New York City:

I claim the washing and separating the metallic parts of the pulverized dust of ores from each other and from the earthy matters by passing the dust through a series of two or more cylinders arranged upon descending levels, connected by pipes, in connection with a stream of water passing through the whole series from a head or funnel, above the level of the highest cylinder, the action of the water and the washing and separating being accelerated and assisted by the revolving arms within the cylinders, substantially as described, thereby separating the metallic parts of the dust in the cylinders, successively from cylinder to cylinder, beginning with the highest, according to the specific gravity of the metal, the heaviest being first separated and deposited, and so on through the series.

44,527.—Meat-cutter.—C. L. Gilpatric, Lewiston, Maine:

I claim the tub, F, the knife, H, the cog wheel, g, the bevel wheel, n, pawl, m, and ratchet wheel, K, the whole arranged, constructed, and operated substantially as herein described.

44,528.—Glue.—Emerson Goddard, New York City:

I claim the instantaneous glue, herein described, as a new article of manufacture.

44,529.—Cutting Ice for Storage.—Valentine H. Hallock, Milton, N. Y.:

I claim a machine for cutting ice for ice-houses, composed of circular saws, one or more, connected with or fitted on a mounted frame, and operated from the traction wheels thereof, through the medium of suitable gearing, substantially as herein set forth.

I further claim the guide or guard, I, arranged and applied to the frame, A, to operate in the manner substantially as and for the purpose herein set forth.

44,530.—Mode of fastening on Buckles.—Lewis Hilbright, Newark, N. J.:

I claim the fastenings, A A, representing two points of the tongue, D D, cut and stamped out of one piece, in a manner to hold and prevent the strap to slip out.

Further do I claim the two ears, B B, bent upon the tongue, D D, to form a loop to allow the end of the strap to slip through easily.

Further do I claim the cross bar, C, of the buckle frame, E E, pressed down from the inside and forming a rest for the tongue, D, rest and frame being one piece.

Lastly do I claim the fastening of two straps with three tongues, which consist of one solid piece.

44,531.—Water Elevator.—A. D. Humphrey and Tobias Forbes, Clyde, N. Y.:

We claim the crank, C, constructed and operating substantially as specified, in combination with the loose disk, B, and fast disk or cylinder, A, for the purpose herein set forth.

We also claim the disk, B, having a scalloped or round furrowed edge, in combination with the rounded detent, H, when applied to a windlass, substantially as shown and described.

44,532.—Steam Pump.—Ignatz Illofsky (assignor to himself, Simon Donau, Philip Stern, Salamon Nordlinger, and Joseph Stern), Pesth, Hungary:

I claim the arrangement of the vessel, A, provided with pipes, B D E F G and H, when combined in the manner and for the purpose substantially as specified.

44,533.—Steam Blast Apparatus.—Gustavus A. Jasper, Charlestown, Mass.:

I claim the combination and arrangement of the dirt and condensed water collecting pipe, C, provided with a stop cock, D, with the series of perforated blast pipes, A, and the conduit, B, the whole being arranged substantially as and for the purpose or objects as specified.

I also claim the combination of the auxiliary waste pipe, F, and the stop cocks, G and E, with the conduit, B, the series of blast pipes, A, or the same, and the dirt and condensed water collecting pipe, C, furnished with a stop cock, D, as set forth, the whole being arranged substantially as and to operate in manner and for the purpose as herein-before explained.

44,534.—Artificial Leg.—George B Jewett, Salem, Mass.,

I claim the combination of the secondary supporter, made substantially as described, with the artificial leg, and the primary supporter thereof, the whole being as and for the purpose or objects as herein-before specified.

44,535.—Stubble-cleaner for Plows.—John Lacy and George Watkins, Bristol, Wis.:

We claim providing a plow with a plate, B, when constructed and arranged, substantially as and for the purpose herein set forth and described.

44,536.—Railroad Car Seat.—Conrad B. Lashar, New York City:

I claim a movable seat combined with the stationary seats, substantially as specified, when the movable seat is forward of and higher than the stationary seat, as set forth.

44,537.—Railroad Switch.—Reuben Lezott, Plattsburgh, N. Y.:

I claim the movable heads as attached to the horizontal rod, as herein described and for the purposes set forth.

© 1864 SCIENTIFIC AMERICAN, INC.

44,538.—Stove.—William J. Lyman, East Hampton, Mass.:

I claim the employment or use, in a stove, of one or more series of axes or shafts, provided with plates or dampers, arranged so as to form, when turned in a certain position, flues within the stove so as to give a sinuous route to the draught, and also admit of being turned so as to allow a direct draught when required.

I further claim in combination with the dampers, the axes or shafts thereof, of tubular form, to serve as radiators, substantially as set forth.

[This invention relates to a new and improved arrangement of dampers placed within a stove in such a manner that they will, when turned or adjusted in a certain position, form a flue in order to give a sinuous route or passage to the draught and cause a greater amount of heat to be radiated from the stove than when a direct passage is allowed the draught, the dampers at the same being capable of being so adjusted as to admit of a direct draught when required as in kindling the fire.]

44,539.—Dumping Car.—W. R. Maffit, Wilkesbarre, Pa.:

I claim the rockers B, and cross rails or bearers, D, applied in combination with the car body, A, and truck frame, E, in the manner and for the purpose substantially as herein shown and described.

[The main object of this invention is to make a dumping car as low as possible to reduce or avoid the expense of shoveling the material. The invention consists in the application to a car of transverse rockers, supported by cross rails or screws which are secured to the under side of the truck frame in such a manner that the rockers are brought down to the ground as near as possible, and the car can be tilted sideways to an angle of 45 degrees or more, while the platform or bottom of the same is comparatively low and close to the surface of the truck frame.]

44,540.—Machine for loading Hay.—Henry Maycock, Verona, N. Y.:

I claim the standard, C, with the horizontal movable turning arm, E, at its upper end in combination with the fork, H, rope, G, and the elevating mechanism composed of the pulley, D, arranged with a clutch and gearing with the back wheel, A*, of the wagon, substantially as and for the purpose herein set forth.

I further claim the lever, F, applied to the arm, E, and used in connection with the rope, G, chains or cords, M O, and the fork-elevating mechanism, substantially as and for the purpose specified.

[This invention relates to a new and improved hay-loading attachment to be applied to wagons, and is designed to be operated from ono of the wheels of the same, so that hay may be gathered up from windrows and deposited in or on the wagon, as the latter is drawn along, with but one attendant to manipulate the fork and one to adjust the hay on the wagon.]

44,541.—Vulcanizing Apparatus for Dentists.—John L. McDermut, New York City:

I claim, first, An oblong, oval, or other shaped vessel adapted to receive two flasks, arranged in one double or two single clamping frames, side by side on the same level, and so as to place two vulcanite plates or pieces for a set of artificial teeth under like influences of temperature during the process of vulcanization, in contradistinction to a cylindrical vessel for placing two flasks one upon the other, substantially as described and shown.

Second, The combination of an oblong, oval, or other shaped vessel, with a double clamping frame or two single ones adapted to the interior thereof, and with two flasks and molds for a set of artificial teeth mounted on plates or pieces of india-rubber to be vulcanized, and with springs and set screws, the whole to be arranged, combined, and operated substantially as and for the purposes described and shown.

Third, I also claim the form of the channel ways cut out of the channel ways cut out of the plaster cast for the free escape of any surplus rubber placed within the molds, substantially as and for the purposes specified and shown.

Fourth, I also claim the method of constructing a thermometer with an enclosed bulb chamber, to be inserted within the steam chamber of a vulcanizing or other vessel, as and for the purposes described and shown.

44,542.—Water Heater.—John M. McIntyre and Robert Meginnity, Detroit, Mich.:

We claim a coil pipe, B, combined and arranged with a water heater, A, in such a manner that the coil may be heated by the waste heat either within the pipe or flue of the stove, or over or on the latter, or at any point or place outside the fire chamber of the stove or range, substantially as and for the purpose set forth.

[This invention has for its object the dispensing with the ordinary "water backs," which are placed in stoves and ranges, and communicate by means of pipes with the heater or water receptacle, in order to heat the water therein. These "water backs" absorb a great amount of heat, and greatly deteriorate the baking qualities of the stove.]

44,543.—Picture Varnish.—John McKillop, Brooklyn, N. Y.:

I claim the varnish or coating composed of gelatin, alum, or its described equivalent, and water, in about the proportions herein specified.

[By means of this varnish lithographs, show-cards, or pictures of any description can be protected in the most effective manner.]

44,544.—Brick and Mortar Elevator.—James McNamara, Buffalo, N. Y.:

I claim the combination of the pulleys, F F, endless ropes, G G, and lower pulleys, F' F', suspended in frame, H, with the removable boxes, K K, and crank pinion gearing, D C, or its equivalent, arranged and operating substantially as and for the purposes set forth.

I also claim in combination with the endless ropes, G G, and receptacles, K K, the hooks, b b, constructed substantially as described, and operating as and for the purposes set forth.

I also claim in combination with the grooved pulleys, F F F' F', and endless ropes, G G, the suspension pulley frame, H, lever platform, I, and weight, a, or its equivalent, whereby the ropes, G G, are made self-adjusting to a vertical position and retained therein, substantially as shown and described.

44,545.—Breech-loading Fire-arm.—Dustin F. Mellen, Manchester, N. H.:

I claim, first, Making the breech plug in two sections, substantially as shown, that is to say, connected by an axial screw bolt, g, upon which the rear section rotates, clamped together by the engagement of the sectional screw thread, a', on the rear section, C', of the plug, with the corresponding thread in the inside of the box, the rear portion being restrained from rotation in either the firing or the loading position by the engagement of one of the spring pins, d' d', with the holes in the sectional plug, C', from which they are drawn, when it is required to withdraw or drive home the breech plug by the pin, d.

Second, Securing the cover, B, of the opening in the breech of the gun by means of its hook and the pin, S, in the groove of the plug, substantially as shown.

Third, The method of operating the cartridge case, retracting hooks, D D, by means of their spring shanks and the inclines, t t, on the back of the hooks and the inclines, v v, in the bore so as by the impingement of the said inclines, to throw back the hooks and release the cartridge case, substantially as shown and described.

[This invention consists in certain improvements in breech-loading fire-arms, the breech plug being made in two sections, and the empty case of the discharged cartridge being withdrawn when the breech is opened, by means of hooks set on opposite sides of the breech plug.]

44,546.—Combined Time, Percussion, and Concussion Fuse.—Anson Merriman, New York City:

I claim, first, The combination and arrangement in a fuse of a of a friction primer (to fire the time fuse composition), located at the outer end of the fuse case, with a driver located at the inner end of said case, so that the former is outside of the time fuse (when it is in place) and the latter is inside of it, substantially as set forth.

Second, I also claim the combination and arrangement of a friction primer located at the inner end of the fuse case (to fire the bursting charge of the projectile) with a driver located nearer the outer end of the fuse case, substantially as set forth.

Third, I also claim the combination of the fuse tube with a driver so constructed and arranged that it can displace the tine fuse when moved outward in the fuse tube or case.

Fourth, I also claim the combination of the driver for operating a friction primer (or for displacing the time fuse) with a percussion primer so arranged relatively to the driver that said percussion primer may be exploded by the movement of the driver in performing its other function, substantially as set forth.

Fifth, I also claim the combination of the driver with a friction casing or sleeve perforated and indented, substantially as set forth

44,547.—Vegetable-slicer.—Bernard Morahan, South Brooklyn, N. Y.:

I claim the dish, A, provided with an oblique slot, d, and nicks, c, in combination with the set screws, e, and knife, B, arranged as specified, so that an ordinary table knife can be readily inserted and removed, and a simple and effective vegetable-slicer is produced.

[This slicer is very convenient, and an excellent article for housekeepers, hotels, steamboats, etc. A full description and an engraving of the same will be found on page 152, current volume of the SCIENTIFIC AMERICAN.]

44,548.—Heating Apparatus.—Oscar F. Morrill, Chelsea, Mass.:

I claim the combination of the internal air currentforaminous disseminator, B, with the argand lamp or burner, A.

I also claim the combination of the external air current foraminous disseminator, C, with the argand lamp or burner, A.

I also claim the combination of the external air current foraminous disseminator, C, with the argand lamp or burner, A, and the internal air current foraminous disseminator, B.

I also claim the combination of the heat interceptor, E, with the argand lamp or burner, A, and one or more foraminous disseminators, arranged with the wick substantially as described.

I also claim the combination of a lamp or burner, A, and one or more foraminous air disseminators with a stove or stand, D, for supporting a vessel or article to be heated by such burner, the whole being arranged substantially as described.

I also claim the foraminous disseminator as made with the solid and extended head, k, substantially as described.

I also claim the combination of one or more air current foraminous disseminators with a wick, and a tube applied to a vessel for containing a combustible liquid to be taken up by or received into and burned on the said wick.

44,549.—Heating Apparatus.—Oscar F. Morrill, Chelsea, Mass.:

I claim the combination of the air disseminator, K, and the cup, I (or its equivalent), with the conduit, retort, or vaporizer, D'', when combined with or making part of an aero vapor heating apparatus, as described, or its equivalent.

I also claim the combination of the air disseminator or chimney, K, and the cup, I (or its equivalent), with a column, D'', extending through the disseminator and over the cup or burner, and for the purpose of spreading the flame of the cup or burner within the disseminator, in manner as specified.

And I also claim the heating cup, I, and the air disseminator, K, combined with the retort or vaporizer, D'', in such manner that such cup may be separated or insulated from such retort, conduit, or vaporizer, substantially as and for the purpose as specified.

I also claim the combination of the cup, I, with the stand, A, of the heating apparatus, substantially in manner as described.

44,550.—Machine for sawing Staves.—Charles Mowry, Oneida Lake, N. Y.:

I claim, first, The jointing saws, M O, either or both when used in combination with the barrel saw, C, for the purpose specified.

Second, The operating or adjusting the jointing saws, M O, through the medium of the shaft, H, connected with the bar, E, as shown, the pulley or wheel, J, and rods, K K', connected respectively with the slide, L, and bar, N, to which the saw arbors are attached, substantially as set forth.

[This invention consists in the employment or use of a barrel saw in connection with a novel feeding device and jointing saws, all arranged in such a manner that the staves may be sawed in proper bilge form, and jointed at one and the same operation.]

44,551.—Box or Tub for Putting up Butter.—Justus Parce, Fairport, N. Y.:

I claim the follower, B, in combination with the butter box, A, provided with the opening, b, in the bottom, substantially as and for the purpose herein set forth.

44,552.—Weather Strip for Doors.—S. W. Perkins, Geneseo, Ill.:

I claim, first, The plate, D, provided with the oblique slot, a, and having a pin, b, fitted in it, and also provided with the slot, c, to receive the spring, F, and applied to the door to operate in connection with plate, i, in the manner substantially as and for the purpose set forth.

Second, The plate, F, provided with the oblique slots, f f, with pins, g g, fitted in them, said plate being applied to the door to operate in connection with the plate, i, substantially as and for the purpose specified.

[This invention relates to a new and improved weather strip for doors and windows, and it consists in a novel application of two plates to a door or window, one at the bottom and the other at one edge, whereby rain is effectually prevented from being driven by the wind underneath a door or window or between the disengaged edge of the same and the jamb against which it closes.]

44,553.—Automatic Fan.—John B. Powell, Philadelphia, Pa.:

I claim, first, The brace, A, containing the driving spring, the column, C, and adjustable tube, E, carrying the fan, K, in combination with the devices herein described or their equivalents for transmitting motion from the spring in the base to the fan, without interfering with the ready vertical and lateral adjustment of the latter, as set forth.

Second, The internal tube, D, and external tube, E (the latter carrying the fan, K), and any suitable system of gearing for transmitting motion to the same from the said internal tube in combination with the column, C, and shaft, B, the whole being constructed and arranged substantially as and for the purpose herein set forth.

44,554.—Harness Buckle.—George Purple, Wellington, Ohio:

I claim the combination of the buckle frame, A, with the metal piece, C, tongue, b, strap, B, and tug, E, when constructed and operated substantially in the manner and for the purposes described.

44,555.—Machine for making Eyelets.—Jesse F. Richards, Providence, R. I.:

I claim, first, A compound male cutter 3, "former" 2, and punch, 1, in combination as described for the purposes specified, constituting together the moving instruments in the formation of an eyelet.

Second, A compound female cutter, 4, "former" 5, and punch, 6, in combination as described for the purposes specified, constituting together the stationary instruments in the formation of an eyelet.

Third, I also claim the combination of the series of moving instruments above mentioned, with the series of stationary instruments above mentioned, in the manner substantially as described for the purposes specified.

Fourth, I also claim operating the said moving instruments above mentioned, in the order and in the manner substantially as described.

Fifth, I also claim in combination with the stationary instruments above mentioned, wherein the eyelet is formed a shield, n, applied and operated in the manner substantially as described.

44,556.—Scissors.—Francis G. Sanborn, Andover, Mass.:

I claim attaching a cutting edge and bed to the shanks of scissors, in the manner substantially as described.

[This invention is designed to combine the ordinary scissors and the button-hole scissors in one implement, in such a manner as that each shall be independent of the other in their positions, and the efficiency of each be as complete as though they were separate implements.]

44,557.—Machine for Condensing Peat.—N. C. Sawyer, Boston, Mass.:

I claim, first, The vibrating mold or segment, T, in combination with the pipe, S, piston, R, and mill or hopper, E, substantially as set forth and for the purpose described.

Second, The combination of the piston, R, cam, h, lever, Z, link, V, and mold, T, substantially as and for the purpose described.

Third, The combination of the link, W, piston, U, and mold, T, substantially as and for the purpose described.

Fourth, The slot, o, in the link, W, to operate in combination with the piston, U, mold, T, and pipe, S, substantially as and for the purpose described.

Fifth, So constructing the end of the piston, U, as to leave a groove in one end of the blocks of peat formed in the mold, substantially as described.

Sixth, So constructing the mold, S', as to form a cornered or grooved block of peat, substantially as described.

44,558.—Filter and Cooler.—Henry M. Seavey, Chicago, Ill.:

I claim, first, The combination and arrangement of the reservoir, D, and ice chamber, C, when the latter is isolated fram the former and arranged within it as shown and is provided with the perforations, a, substantially as and for the purposes herein shown and described.

Second, I claim in combination with the above the employment of the removable cylinder, G, as and for the purposes specified and shown.

44,559.—Test Pump.—Thomas Shaw (assignor to himself and Philip S. Justice), Philadelphia, Pa.:

I claim the combination of hollow piston rod, B, with screw, u, chamber, v, for the purpose specified.

44,560.—Apparatus for Carbonizing Air for Illuminating Purposes.—Warren A. Simonds, Boston, Mass.:

I claim a wheel or wheels with more or less spokes attached to each hub, and with perforated hollow globes made fast to each end of said spokes for agitating volatile liquids when used for the purpose of carbonizing the air for illuminating purposes, as herein specified and described.

44,561.—Feed Water Heater.—Edwin R. Stilwell, Dayton, Ohio:

I claim, first, Purifying feed-water for steam boilers by means of a steam trap which consists of a box, A C, provided with steam orifices, e g, overflow box, c, and perforated shelves, a a, arranged substantially as described.

Second, The combination of the overflow box, c, perforated shelves, a a, and steam inlets, e g, with the chambers, C and D, substantially as described.

44,562.—Railroad Rails.—George D. Teller, Buffalo, N. Y.:

I claim, first, A secondary rail, E, made of steel or the best quality of iron and inserted into a groove made in the top of the main rail, for the purposes and substantially as described.

Second, The part, e', whether made of iron or other elastic material, in combination with the main rail, A B, and secondary rail, E, for the purposes and substantially as set forth.

Third, Making the rails, A and B, with a tongue in one and a groove in the other as represented at c' (or the equivalent thereof), in combination with the bolts, D, for the more securely locking or fastening the said parts together, as described.

44,563.—Core Barrel.—James E. Thomas, Pittsburgh Pa.:

I claim the longitudinally moving slides, g, in combination with the toggle arms, d, screws, b, and sections, a a', constructed and operating substantially as and for the purpose herein shown and described.

[This invention consists in the application to the center bar of a core barrel, of a screw and nut in combination with toggle arms attached to slides and with movable sections in such a manner that by the combined action of said screw and nut and of the toggle arms two or more of the sections of the barrel are drawn inward and upwards, and at the same time the remaining sections are relieved and allowed to collapse, or by reversing the motion of the nut the several sections are moved back to their original position and the barrel is restored to its original shape and size.]

44,564.—Wind Wheel.—Nehemiah Trull, Shaker Village, N. H.:

I claim the combination of the ball governor, R, with the wings or fans, I, through the medium of the sliding shaft, L, fitted within the wind wheel shaft, E, and connected with the rods, J, of the wings or fans, by means of the pinions, e, and racks, f, substantially as set forth.

I further claim the lever, U, and sliding tube, T, when arranged in connection with the governor, R, substantially as and for the purpose specified.

[This invention relates to a new and improved wind wheel of that class which are designed to be self-regulating, and it consists in a novel and improved manner of applying a governor to the wings or fans of the wheel, whereby said wings or fans by a very simple means are made to adjust themselves more or less obliquely to the wind, according to the velocity of the latter and a uniform speed of the wheel obtained under different degrees of velocity of the wind.]

44,565.—Sash Stopper and Lock.—W. Van Gaasbeek William's Bridge, N. Y.:

I claim the stopper and lock consisting of a lever, C, so constructed with a recess, b c, for the reception of the edge of the sash, that it may when applied to work at right angles to the plane of the sash, hug or bite against or into the inner and outer surfaces of the sash, substantially as and for the purposes herein specified.

44,566.—Pianoforte.—Maurice Vergnes, New York City:

I claim the location of the action inverted in the contracted space front beneath the keys, in the manner described.

44,567.—Machine for shaving Hoops for Casks.—Samuel Wagner, Monroe, Wis.:

I claim the tongs, L, arranged to be operated by a weight, gearing and drum, substantially as shown in combination with a cutter, S, and a semi-circular cutter, T, substantially as and for the purpose set forth.

[This invention relates to a new and useful machine for shaving poles or timber for cask hoops, either split poles or pieces cut from a log.]

44,568.—Knitting Machine.—Samuel Wallis, Townsend, Mass.:

I claim, first, The double-acting guide needles, k l, acting alternately as thread guides and needles, substantially as set forth.

Second, I claim the draw, bars, q r, for the purpose of drawing off the loops from the needles, operating substantially as described.

Third, I claim in combination with needles which act alternately as needles and guides, reciprocating one or both of the needle bars, I J, laterally by any suitable device for the purpose of interlacing or connecting the work, substantially as set forth.

Fourth, I claim the wheels, D and E, with their cam grooves, a, for operating the carriages, F and G, and the needle bars, I J, substantially as set forth.

44,569.—Mode of securing Shoes to Horses Feet.—C. Weitman, Hazleton, Iowa:

I claim securing shoes to the feet or hoofs of horses by means of bars bent or curved so that their lower parts may clutch the shoe or hook over the same and their upper parts made to penetrate into the side of the hoof, in combination with the bar formed of two parts fitted together and arranged with a screw to serve as a clamp, substantially as herein set forth.

[This invention relates to a new and improved mode of securing shoes to the feet or hoofs of horses, whereby the use of nails is entirely dispensed with and the shoes rendered capable of being readily secured to and detached from the feet or hoofs.]

44,570.—Mill Pick.—Joel A. Wheeler, Cleveland, Ohio:

I claim the head consisting of the parts, D E F G, in combination with the screw socket, H J, and blades, A A, when constructed and operating in the manner and for the purpose set forth.

© 1864 SCIENTIFIC AMERICAN, INC.

44,571.—Car Coupling.—N. S. White (assignor to himself and Richard Vaughn), Port Chester, N. Y.:

I claim the sliding stop, F, arranged with springs, d, and a cam, I, in connection with the arms, C D E, attached to a hub, a, placed loosely on the shaft, B, said parts being applied to a draw-head, A, and all arranged to operate in the manner substantially as and for the purpose herein set forth

[This invention relates to a new and improved car coupling of that class which is commonly termed self-coupling, and it consists in the employment or use of a vertical sliding stop arranged with springs and a cam, in connection with a pin fitted on a shaft or axis provided with two arms, all being arranged within or applied to a draw-head in such a manner that a very simple and efficient car coupling of the kind specified is obtained.]

44,572.—Gas Engine.—S. Lloyd Wiegand, Philadelphia, Pa. Ante-dated Sept. 16, 1864:

I claim, first, Protecting the piston or its equivalent from deposits of residuum in the cylinder by means of a fluid of greater specific gravity than the residuum, substantially in the manner shown and described.

Second, Combining the conducting electrical points or circuit closing apparatus with the valve gear so that the circuit is closed after closing the valve, substantially as shown and described.

Third, Combining the regulator with the induction valves so as to regulate the duration of flow of gas and air or other explosive mixture to the cylinder or its equivalent by the velocity of the engine, and thus to control the velocity of the engine, substantially in the manner shown and described.

Fourth, The induction valves when constructed and used substantially as described.

Fifth The eduction valves when constructed and used substantially as described.

Sixth, Imparting motion to the valves by means of the coupling hafts, in the manner hereinbefore set forth and described.

44,573.—Steam Hammer.—Charles W. Willard & John P. Willard, Chicago, Ill.:

We claim the rollers, b b′, adjustable on the yoke, c, and operating in combination with the cam, a, steam cylinder, D, and hammer, A, in the manner and for the purpose substantially as herein shown and described.

[This invention consists in the employment or use of two rollers adjustable on the yoke in the direction in which the cross-head moves, in combination with a double inclined cam secured to or moving with the cross-head of the steam piston which is connected to the helve of the hammer in such a manner that by the action of the double inclined cam on the rollers the steam valve is changed, and by adjusting the rollers up or down on the yoke the stroke of the hammer can be regulated with the greatest accuracy and with little trouble or loss of time.]

44,574.—Mode of Operating Railroad Cars.—Charles E. Willis, New York City:

I claim, first. The brake levers, H H′, arranged in combination with each other and with the hinged shoes, J J′, and screws, I I′, in the manner and for the purpose substantially as described.

Second, The combination of the brake levers and guide wheel levers with each other and with the screws, I I′, or their equivalents, constructed and operating substantially as and for the purpose specified.

44,575.—Packing for Stuffing Boxes of Steam and other Engines.—Morris Botticher (assignor to Richard Burr & Max Haarburger), Washington, D. C.:

I claim the mode and manner of packing stuffing boxes with cotton pulverized asbestos and soapstone, as herein described and for the purposes set forth.

44,576.—Claw-bar.—Maxwell Cornelius (assignor to himself and R. B. More), Cincinnati, Ohio:

I claim the double claw-bar, constructed substantially as above set forth and described.

[This invention consists in making claw-bars, for drawing railroad spikes, and bolts, double, that is, with a distinct pair [of claws upon opposite sides of the head, whereby the ends of one pair serve as the fulcrum of the other pair.]

44,577.—Lantern Guard.—Wm. R. P. Cross (assignor to himself and Charles H. Breed), Portland, Maine:

I claim, first, A lantern guard constructed so as to open at f, and to slide at g, substantially in the manner and for the purpose described.

Second, The combination of the sliding hinge joint at g, the hinged collars, b c, and the hinged brace fastening, f, substantially in the manner and for the purpose described.

44,578.—Camp Chest.—Frederick Graves, Avoca, N. Y., assignor to himself and Charles G. Roberts, Greene, N. Y.:

I claim the special construction herein described, consisting essentially of the box, A, provided with the compartments, B C, folding chair and lounge sections, H I K, adjusted by the straps, k k, or equivalent bars, D D, extension slides, E E, and table-leaf, G, the whole arranged, combined, and operating substantially as and for the purposes herein set forth.

44,579.—Gag Swivel.—Walter Greacen (assignor to himself and Wm. Robotham), Newark, N. J.:

I claim the application of the button, c, in combination with the loop, b, and plate, a, constructed and operating substantially as and for the purpose herein set forth.

44,580.—Rock-breaking Device.—A. W. Hall (assignor to himself, Samuel Jandon and R. H. Belden), New York City:

I claim the stationary jaw, A, having a single plane surface in connection with an oscillating jaw, C, provided with two plane surfaces, b b′, one above the other, with a concave surface, c, between them, to operate in the manner substantially as and for the purpose specified.

44,581.—Fuse for Explosive Shells.—James McIntyre (assignor to himself and James D. Bacon), New York City:

I claim a tapering plug introduced into a tapering hole in the powder of the fuse, with the larger end of the said plug towards the outer end of the fuse, for the purposes and as specified.

44,582.—Jib Sail Ring.—Raymond Balons, Paris, France. Patented in France Feb. 1, 1864:

I claim the application to jib sail rings of a transversal roller, dividing the circle into two parts, and the addition to the said rings of a hold fast hook corresponding with the eyelets by which the sail is secured thereto, the whole constructed in manner and for the purpose substantially as herein set forth and represented in the annexed drawing.

44,583.—Material for lining the Bearings of Shafts, Axles, etc.—Richard Burley, London, England:

I claim the use of the metals, semi-metals, or alloys as above described, whether formed, mixed or combined together by two separate processes as above described or by one process, as the same may be done.

44,584.—Hydraulic Propeller.—Albert Pagenstecher, of Valparaiso, Chili. Ante-dated Sept. 30, 1864:

I claim, first, The employment or use of rotary pumps, C, applied to a vessel, A, in combination with pipes, E, issuing into large pipes, F, and producing an action similar to an injection, in the manner and for the purposes herein described.

Second, The combination of the horizontal pumping cones, C b b, conical barrels, B, pipes, E E, and revolving nozzles, G, all constructed, arranged and operating substantially as specified.

44,585.—Machine for Fluting Rollers.—William Wield, of Manchester, Eng. Patented in England Sept. 20, 1859:

I claim the milling mechanism, consisting of the milling tools, g g g, weighted crank levers, f′ f′, and eccentric shaft, h2, or their equivalents, in combination with the friction rollers, k k k k, or their equivalents, the whole being combined and used with the slide carriage, feed mechanism and other parts of the lathe necessary to operate them, as described, for the purposes shown.

RE-ISSUES.

1,783.—Mode of operating Brakes of Railroad Cars.—Alfred Berney, of Jersey City, N. J., assignee by mesne-assignment of Charles B. Turner, of Buffalo, N. Y. Patented Nov. 14, 1848, and extended:

I claim, first, The combination of a sliding bumper with a rod and a brake system and an interposed spring, the combination being substantially as specified and operating substantially as described.

Second, The combination of a sliding rod, a bumper, a guide or cheeks and a locking plate, all substantially as set forth, whereby the spring forms a connection either between the bumper and the car body or the bumper and a system of brakes, substantially in the manner and for the purposes set forth; and,

Third, A locking plate, in combination with a sliding rod, capable of operating a brake system and a bumper, whereby the bumper may either be permitted to or prevented from communicating motion to a brake system under a mode of operation substaetially as hereinbefore set forth.

1,784.—Operating Brakes of Railroad Cars.—Alfred Berney, of Jersey City, assignee by mesne-assignment of Charles B. Turner, of Buffalo, N. Y. Patented Nov. 14, 1848, and extended:

I claim, first, The combination of these three elements, viz.:

A lever having the characteristics specified; two connections between said lever and two systems of brakes, and a connection between said lever and a windlass, the whole being combined and working together to produce results substantially such as are specified under a mode of operation substantially as set forth.

Second, A combination of four levers and their connecting rods, arranged with reference to each other, and operating substantially as specified, whereby pressure may be exerted on four rubbing surfaces on the same side of a car, substantially in the manner and under the conditions hereinbefore described.

1,785.—Mode of Burning Petroleum and other Hydrocarbons.—Levi L. Hill (assignor to Simon Stevens), of New York City. Patented Dec. 20, 1859. Reissued Feb. 24, 1863:

I claim, first, The mode or process herein described for burning petroleum and similar hydrocarbon liquids for the production of heat or light, or of heat and light.

Second, Combining or mixing steam or the vapor of water with hydrocarbon vapor and air, substantially as set forth, for producing by combustion an intensely heated flame for generating steam and for metallingic and other similar purposes.

Second, The use of a platinum cap or chimney, constructed and operating as described, in combination with a jet of the mixed vapors of a hydrocarbon and air, with or without steam, for the production of light, as set forth.

1,786.—Grain Separators.—John A. Krake, of Alden, N. Y. Patented Nov. 27, 1855:

I claim, first, Suspending or supporting the shoe, D, of a fanning mill, or its screens, by means of the vibrating arms, d d, and rock shaft, E, or equivalent, in such manner as to brace said shoe or screens against any longitudinal movement, but to allow a free and regular lateral motion, combined with a vertical one, produced by the oscillating or pendulous motion described, said shoe or screen and vibrating arms being combined with each other, and with the fanning mill, for the purpose herein set forth.

Second, In combination with the shoe, D, thus vibrated by the arms, d d, and with the similarly-vibrating shoe or screen, G, I also claim the shaft, K, having the angle irons, k k k, provided with adjusting holes, u u, and the couplings, v v, the whole so arranged that an equal or an unequal action may be given to said screens, and the same vibrated to a greater or less degree, substantially as herein specified.

1,787.—Packing Projectiles for Rifled Ordnance.—Wm. H. Smith and Royal M. Bassett, of Birmingham, Conn., and Chas. D. Gibson, of New York City, assignees of said Wm. H. Smith. Patented Jan. 5, 1864:

We claim making the jacket or centering case of a sufficient diameter only (during the greater portion of its length) to fit over the bolt or body, A, of the projectile, and with an enlargement near its forward end, in combination with a suitable band or washer near its rear, the whole constructed to operate substantially as and for the purpose set forth.

Second, I claim the employment, in combination with the jacket or centering case, having an enlargement near its front end and a band washer or washer, or the equivalent thereof, near its rear end, of a surrounding band or belt of packing material, E, substantially as set forth.

Third, The combination of the sliding bar or washer, C, with the casing, E, and sabot, D, the whole arranged to operate substantially as described, for the purpose set forth.

1,788.—Projectile for Rifled Ordnance.—W. H. Smith and Royal M. Bassett, assignees of said W. H. Smith.—Patented Dec. 23, 1862:

We claim the employment, in combination with the body or bolt of a sub-caliber projectile of a metallic centering and guiding holder case or its equivalent, having its front and rear portions fitting the body or bolt, and adapted to fill the bore of the gun, and united by an intervening portion in the manner substantially as set forth, for the purpose described.

1,789.—Apparatus for Forcing Oil from Oil Wells.—The Bordentown Machine Company (assignees of James Molyneux), of Bordentown, N. J. Patented April 5, 1864:

We claim the pipe, B, of an artesian oil well (with or without a supplementary pipe) so combined with a pump or steam boiler that by the use of compressed air or steam the oil in the well may be forced upward therefrom through the pipe, B, or through a supplementary pipe, all substantially as set forth.

EXTENSION.

Sofa Bedsteads.—Russell Scarritt, of St. Louis, Mo. Patented Oct. 8, 1850. Re-issued Jan. 7, 1851:

I claim the combination of the frames, D D, which are of the same form of the sofa ends, F F, with the said sofa ends, substantially in the manner and for the purpose as herein set forth, to wit: When the back, A, is elevated, to convert the sofa bed into a sofa, the frames, D D, must be swung inward against the sofa back, to retain it in an elevated position, and to throw the said frames out of the way and out of sight, and when it is desired to change the sofa bed from a sofa to a bed, the said frames, D D, can only be swung outward into a line with the sofa ends, F F, so that the ledges, I I, on the inner sides of the same, will unerringly catch and retain the back, A, when it reaches a horizontal position, as it is thrown backward, in which position the sofa ends, F F, and the swinging frames, D D, will form an ornamental and uniform head and foot to the bed form of my improved sofa bed.

I also claim the placing of the pivots, t t, which suspend the mattress frame, A, such a distance from the lower or inner edge of the same that when the said mattress frame is thrown backward into a horizontal position, the lower or inner edge of the mattress, A′, will by that movement be thrown forward and press against the rear edge of the mattress, B′, with such force as to form a close and an elastic joint between the two, and thereby furnish an extra width to the bed form of my improved sofa bed, substantially in the manner herein set forth.

I also claim the projection of the mattress, A, below the pivots that it turns upon, in combination with the movement of the mattress, B′, or hinges located at its front edge, by means of which a firm and close joint is formed between the rear end of the mattress, B′, and the face of the mattress, A′, when they are arranged in the form of a sofa, which joint aids in retaining the said mattress, A′, in an elevated position, substantially as herein set forth.

Machine for folding Paper.—George K. Snow, Watertown, Mass. Patented Oct. 15, 1850. Re-issued April 3, 1860:

My improvement or combination as invented and claimed by me consists of the following elements:—First, A slotted plate, B, table or contrivance for receiving and supporting the sheet. Second, two parallel planes or plates, L M, extending at right angles from such support and so arranged that there shall be one of the said plates on each side of the slot, b, of the first element or support of the sheet. Third, A striking and folding frame or plate, D, so arranged and operated as to press the paper against the middle or other proper part of it, force it downward through the slot and between the two parallel plates the said parallel plates operating to complete the fold and hold the sheet of paper during the return or retrograde movement of the striking frame or plate. And in combination therewith I claim a second striking and folding plate, N, arranged at right angles to the said two parallel plates, and made so as to press or operate through them or their slots and directly after the said retrograde movement of the first one, as to press against the sheet of paper and force it through one of the said slots and thereby once more or a second time fold it.

And I claim in combination with such second combination of mechanism, a third striking and folding plate, R, and slotted parallel folding plate, S, and friction rollers, p q, or equivalent contrivances the same being for supporting the twice folded sheet of paper, folding it a third time and subsequently discharging it, such discharge taking place in consequence of the return or retrograde movement of the striking or doubling plate, as above described.

I also claim the combination of one or more register points or a registering apparatus, with the sheet receiving table or platform, and an apparatus for producing one or more folds in the sheet.

I also claim a combination composed not only of machinery for folding sheets of paper, but machinery for receiving and piling or packing such sheets in a regular pile or pack.

And I also claim the combination of mechanism which is applied to the striking plate and its rollers or folding contrivances and used for packing the sheets; the said mechanism consisting of the stationary plate, T, and the spring plate, U, or plate and its springs or other proper equivalents which permit the recession of the plate in proportion as the pack of sheets increases in size, the whole being arranged and made to operate substantially in the manner as hereinbefore specified.

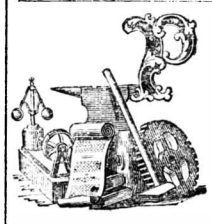
I also claim the combination of one or more edged gages, C C1 C2, with the sheet receiving platform and an apparatus for folding paper, substantially as described.

Machine for transmitting Messages by Electric Telegraph.—Austin F. Park, Troy, N. Y. Extended Aug. 27, 1864:

I claim, first, The two guides, E and h, with their hook and detent spring as described, in combination with the movable connecting points, D D, and the type forms for letters, substantially in the manner and for the purpose set forth, the guides being disconnected as soon as the movable connecting point has passed them, thereby causing the finger key rods to resume their proper position to be again acted upon, and allowing the succeeding points to pass in their regular revolving course, without coming in contact with the type forms.

Second, I also claim the manner of disconnecting the two guides, viz., by the action of the movable connecting point upon the detent spring, as above set forth.

Third, I claim the employment of a clicking apparatus to indicate the proper time of depressing the keys, the whole being constructed and arranged in the manner and for the purpose substantially as herein set forth.



PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of [the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of al the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon

© 1864 SCIENTIFIC AMERICAN, INC.

examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York

Notes and Queries

L. P., of Mass.—We find no errors in your English, but we do not agree with your philosophy. Whether the moon rotates once on its axis during each revolution around the earth has been discussed a good deal, but it is a mere dispute about the meaning of a phrase; all are agreed in regard to the facts. The meanings of words and phrases are determined wholly by use, and as all astronomers say that the moon turns on her axis once during each revolution around the earth, it seems to us that the question is settled.

G. A. E., of Conn.—In forcing water from a small cylinder into a large one, the distances through which the two pistons move are in inverse proportion to their areas. The easiest way to find the area of a circle is to multiply the square of the diameter by .7854. The area of your 3-inch piston is 7, and of your 12-inch 113. Therefore in forcing your small piston down 12 inches, you will raise the larger one 113 : 7 :: 12 : .74, say ¾ths of an inch.

J. M., of Pa.—The momentum of a moving body is its mass multiplied into its velocity, while the *vis viva* is one-half the mass multiplied into the square of the velocity. Momentum is a mere term employed in certain mathematical processes with no corresponding quantity in nature, but *vis viva* is the actual force exerted by any moving body—the sum of the resistances required to bring the body to a state of rest.

H. H., of Iowa.—Your plan for preventing greenbacks from being stolen by the rebels, by placing the money in a shell and firing from a cannon is very novel. But it might be difficult to find the shell after the discharge, even if you were to mark the range as you propose. Don't you think it would be an improvement to fire downwards, so that the shell would be buried in the ground, then place a stick there?

P. P. J., of Ill.—The white powder is chloride of silver. It can be reduced to pure silver by heating it very hot in a clay crucible in contact with carbonate of soda. If you have no chemical furnace and crucible, send it to Prof. Charles A. Seely, 244 Canal street, this city, who will reduce it for you.

R. E. B., of Mich.—Circus horses run round from left to right as well as from right to left. Mill horses generally go with the sun because it is most convenient to drive them that way, and because that is the way that machinery is usually constructed to run.

L. B., of Pa.—Hundreds of small oscillating engines have been made on the plan you propose. It was patented years ago

O. L., of N. H.—Address H. C. Baird, 406 Walnut street, Philadelphia, for a work on optics.

P. B. S., of Maine.—The area of your two 20-inch cylinders is not equal to one 40-inch cylinder, therefore they have not so much power as the single engine.

B. B. G., of Conn.—The connecting rod is generally made 2½ times the length of the stroke where practicable, but circumstances alter cases, and any length will answer.

T. M., of ———A cubic foot of cast-iron weighs 450.55 pounds, of wrought iron 486.65, brass 537.75, and fresh water 62.5.

C. M., of Mass.—A tin vessel to hold one gallon beer measure should measure as follows:—Diameter of top 3¾, of the bottom 8¾ inches, hight 7½ inches.

T. P. M., of Ill.—The area of a 19 5-8th inches circle is 302.489 square inches.

R. W. B., of Conn.—Common plumbers solder is lead two and tin one part.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, Sept. 28, 1864, to Wednesday, Oct. 5, 1864:—

E. P., of Ill., $20; W. T. M., of N. Y., $81; W. W. L., of Ill., $20; D. I. S., of N. Y., $15; A. B. R., of Iowa, $20; H. G. D., of Ky., $40; G. W., of Mass., $15; L. A., of N. Y., $40; J. P. J., of Ill., $20; M. & R., of N. Y., $31; L. M. D., of N. Y., $20; J. P. W., of N. Y., $20; H. M. S., of Ohio, $30; D. H. S., of Conn., $30; A. R., of Wis., $25; E. B., of Pa., $15; S. J. A., of Vt., $35; S. R. B., of Pa., $191; W. T., of Ill., $20; S. R., of Pa., $15; H. J. D., of N. Y., $30; G. C. B., of Ill., $16; R. P., of Iowa, $40; W. B., of Iowa, $16; J. H. G., of Ohio, $16; J. J. S., of Conn., $20; R. W. R. and others, of N. Y., $15; G. D. H., of Ill., $45; R. S., of Canada, $500; J. A., of Ill., $20; G. M. M., of Pa., $50; A. P. Jr., of Vt., $35; J. P., of Ill., $20; J. S., of N. Y., $15; W. J. O., of N. Y., $20; E. R., of Mich., $45; J. A. M., of N. Y., $40; S. A. M., of Ohio, $25; C. B. H., of Ill., $15; W. S., of Mich., $15; F. H., of Ill., $25; S. M. S., of Iowa, $16; P. B., of N. J., $15; H. F. B., of Pa., Mo., $15; T. H. W., of Pa., $100; W. H. M., of Conn, $15; P. C., of Pa., $15; E. H., of Ill.; J. A. C., of Mo., $20; J. P. H., of N. Y., $25; W. S. N., of Mo., $45; J. A. M., of Ill., $20; R. E. B., of Mich., $20; J. M., of Mass., $20; H. W. B., of N. Y., $20; J. F. M., of N. Y., $40; F. J., of N. Y., $40; S. & T., of Ohio, $20; C. H. R., of Maine, $20; R. E. C., of N. Y., $31; C. R. O., of N. Y., $20; F. I., of N. Y., $15; O. L. B., of Wis., $25; A. P. V., of Pa., $16; L. L., of N. Y., $25; C. H. B., of Mass., $15; G. D. T., of N. Y., $20; C. C. B., of Iowa, $15; J. A. C., of R. I., $30; O. E. R., of Minn., $10; G. F. M., of Ohio, $25; J. H., of N. Y., $15; D. W. G., of N. Y., $15; F. W. F., of N. Y., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Sept. 28, 1864, to Wednesday, Oct. 5, 1864:—

W. T. M., of N. Y. (2 cases); F. J., of N. Y.; F. W. F., of N. Y.; S. J. A., of Maine; H. M. S., of Ohio; H. W., of Ohio; J. G., of Pa.; G. F. M., of Ohio; J. F. M., of N. Y.; L. A., of N. Y.; Z. W., of N. J; O. L. B., of Wis.; J. M. S., of N. Y.; A. P., of Wis.; J. A. C., of R. I.; A. P. Jr., of Vt.; J. P. H., of N. Y.; F. H., of Ill.; L. L., of N. Y.; Miss S. A. M., of Ohio; W. T., of Ill.; J. E. S., of N. Y.; C. C. B., of Iowa; H. J. D., of N. Y.; R. P., of Iowa.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that ten words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable

OFFICE OF ARMY CLOTHING AND EQUIPAGE,
Twelfth and Girard streets, Philadelphia, Oct. 2d, 1864.

SEALED PROPOSALS WILL BE RECEIVED AT this Office until 12 o'clock, M., on Monday, the 10th instant, for supplying the Schuylkill Arsenal with the following articles:—

Trousers, sky-blue, for mounted men, army standard.
Do do foot do do
Drawers, canton flannel, army standard.
Woollen Stockings, do
Bootees, large size, 10s to 14s, do
Water-proof ponchos, for shelter tents for horsemen, gutta-percha or india-rubber, army standard.
Water-proof blankets, for infantry, army standard.
Uniform felt hats, Nos. 2, 3, 4, 5, 6, do
Coat buttons, do
Shirt buttons, do
Green worsted lace, 1½ inch, do
Blocking twine, do
Axe slings, do
Hatchet slings, do
National colors, infantry, do
Regimental colors, infantry. do
Regimental index books, do
Regimental order books, do
Hat cords and tassels, artillery, do
White Williamantic cotton, No. 24, sample required
Black wadding, do
Red bunting, do
White bunting, do
Scarlet facings, cloth, do
Sky-blue cloth, do

Also, for prisoners of war, woolen blankets of low grades, samples required.

Samples of such articles as are required to be of army standard, can be seen at this office.

Each bid must be guaranteed by two responsible persons, whose signatures must be appended to the guarantee, and certified to, as being good and sufficient security for the amount involved, by some public functionary of the United States.

Bids from defaulting contractors, and those that do not fully comply with the requirements of this advertisement, will not be considered.

Blank forms for proposals, embracing the terms of the guarantees required on each bid, can be had on application at this office, and none others which do not embrace this guarantee will be considered, nor will any proposal be considered which does not strictly conform to the requirements therein stated.

The bids will state the number or quantity of each kind of article proposed to be delivered.

Bids must be endorsed "Proposals for Army Supplies," stating the particular article bid for.

Col. ALEX. J. PERRY,
Quartermaster's Department, U. S. Army.

MASON'S PATENT FRICTION CLUTCHES FOR transmitting power for hoisting machinery. Also for starting and stopping heavy machinery of every description, without shock or jar, are manufactured by WILLIAM MASON, Providence, R. I. 16 5*

GUN AND PISTOL SCREWS.—COMSTOCK, LYON & CO., Manufacturers (Office 74 Beekman street, New York), are always prepared to furnish Gun and Pistol Screws to sample. Screws to fit the U. S. Musket, Sewing Machine Screws, and Metal Screws generally, of the best quality, at short notice. 16 26

PECK'S PATENT DROP PRESS MANUFACTURED in all its varieties, by M. & C. PECK & CO., Founders and Machinists, New Haven, Conn. 16 26*

WROUGHT IRON PIPE, LAP WELDED BOILER Flues, Brass Cocks, Stop Valves, Water Gages, Steam Whistles, Gas and Steam Filters, Tools, Steam Boilers, Steam Pumps, Feed Pumps, Galvanized Iron Pipe for water, etc., etc. JAMES O. MORSE & GILLIS, 76 John street and 29, 31, and 33 Platt street, New York. 96 12

"INDEPENDENT JAW CHUCKS, MANUFACTURED by L. D. FAY, Worcester, Mass. Cash prices, 12 inches diameter, $30; 15 inches, $35; 20 inches, $50. (The Jaws are wrought iron, case hardened.)" 16 3*

© 1864 SCIENTIFIC AMERICAN, INC.

THE CHEAPEST MODE OF INTRODUCING INVENTIONS.

INVENTORS AND CONSTRUCTORS OF NEW AND useful Contrivances or Machines, of whatever kind, can have their inventions illustrated and described in the columns of the SCIENTIFIC AMERICAN on payment of a reasonable charge for the engraving.

No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

For further particulars address—

MUNN & CO.,
Publishers of the SCIENTIFIC AMERICAN,
No. 37 Park Row, New York City.

INCRUSTATION POWDERS.—"H. N. WINANS, NEW York. Our engineer says your Powder has proved the best thing he ever used. Send another half barrel."
O. B. SANFORD, Watertown, Wis.

ECONOMY IN FUEL.—Winan's Incrustation Powder removes old scale. Charles Staples & Son, Portland, Maine, say:—"It removed scale that we never could get off with the best and sharpest picks."
H. N. WINANS, New York.

H. N. WINANS, New York—"Having used your Anti-Incrustation Powder two years with entire satisfaction and without any injurious effect upon our boiler, we take pleasure in recommending it to others." BEMENT & DOUGHERTY, Industrial Works, Philadelphia.

FUEL AND REPAIRS SAVED.—"H. N. Winans, New York, I have been using about one pound of your Incrustation Powder per week, and it keeps my boiler perfectly clean. Cost, about 50 cents a week." JOSEPH COLLINS, West Lebanon, Pa.

SCALE IN BOILERS.—"H. N. Winans, New York, I have used your Incrustation Powder for six years, with invaluable results. My boilers steam much better, and are always clean; the stuff is more than paid for in the saving of fuel. I have no fear now of the plates burning through, and have no patches to put on. I use two pounds weekly." GEORGE SHIELD, Chief Engineer,
Cincinnati Water Works, Ohio.

H. N. WINANS' INCRUSTATION POWDERS, New York—"I do not hesitate to recommend your Powder. It has afforded me great satisfaction the two years I have used it, keeping my boilers free from scale without any injury."
1* FRANKLIN TOWNSEND, Albany, N. B.

IMPORTANT TO MOULDING-MILL PROPRIETORS, Carpenters and Builders, Cabinet, Car, and Toy Manufacturers, and Workers in Wood generally.—Machines for cutting irregular forms under our patents, have been manufactured in several places, and the Variety Molding and Planing Machine for cutting irregular forms, with safe-guard and feed-table, also for cutting plain and waved moldings, has been manufactured by Messrs. Carpenter & Plass, also by Wm. L. Miller, of New York; but is now owned and manufactured exclusively by the Combination Molding and Planing Machine Company, at the Globe Iron Works, corner of 11th avenue and 33d street, New York, who also own and manufacture the Double Serpentine Molding and Planing Machine, the only machine in existence which can do that work. A circular, giving full description, will be sent on application. Agents solicited. All orders should be addressed to the "Combination Molding and Planing Machine Company," New York. 16 8*

SCOTCH GLASS TUBES, STEAM AND WATER Gages for sale. E. BROWN, 311 Walnut street, Philadelphia. 16 2*

TO INVENTORS OF ANY IMPLEMENTS FOR FARMER'S use, requiring the use of iron or steel, an opportunity may be found to dispose of or develope the same, by addressing, with description, Box 532, Pittsburgh, Pa. 16 10

NOTICE.
Steels or Irons for all kinds. Farming Machines forged or worked into any shape desired, and finished in any style required. All communications promptly answered. Address D. B. ROGERS & SONS, Pittsburgh, Pa. 16 10

GREAT SANITARY PAINT, FOR WHICH THE INventor intends to take out Letters Patent. Health, economy, and comfort. Two hundred per cent cheaper than any other paint for house, domestic, iron or wood built sea-going vessels, etc. Inclose a stamp for circular. THOMAS HODGSON, 7 Beach Place, Brooklyn, near the Hamilton Ferry. 16 2*

HUNT'S PATENT FOOT-WARMER. — WORKS equally well with gas or spirit lamps. Has been fully tested, and is thoroughly efficient wherever artificial heat is desired for the feet—in carriage, sleigh, parlor, or sick-bed. State rights for sale. Address SOLOMON HUNT, Box 1,521, Cincinnati, Ohio. 16 4*

VALUABLE COOKING UTENSIL.—ONE-HALF THE inven.ion will be assigned to any reliable person paying the cost for a patent. Adddress WM. SALISBURY, Wheeling, W. Va. 16 3*

MACHINISTS.—WANTED A FEW GOOD MACHINISTS to work on Steam Engines and Mill-work, to whom will be paid liberal wages, and steady employ given. None but experienced workmen need apply. WASHINGTON MOWING MACHINE COMPANY, Sandy Hill, Washington county, N. Y. 16 3*

FOR SALE.—THE RIGHT OF FIVE STATES YET unsold of J. Peffley's Economical Automatic Lath-cutter. Address JACOB PEFFLEY, Bainbridge, Putnam county, Ind. 16 4* eow

BAIRD'S PATENT INCRUSTATION PREVENTER, and Remover for Steam Boilers, in either Salt or Fresh Water. No invention connected with Steam Power combines so many advantages as this. The economy in fuel alone, from its use, repays the cost of the preventive.
Certificates from Engineers and owners of Steam Boilers, at sea and on shore, can be seen at the office of
JAMES F. LEVIN,
23 Central Wharf, Boston.
MERRITT & WALCOTT { 69 Courtlandt street, New York. 29 Front Levee, New Orleans. 16 4*

SOLID EMERY WHEELS, SILICATE OR VULCANITE, of every size, promptly made or shipped from stock. N Y. EMERY WHEEL CO., 94 Beekman street, New York. 15 2*

WANTED.—A VERY GOOD SECOND-HAND LATHE with slide rest, or light Engine Lathe, to do model work Any person having such Lathe for sale will please describe it a n price. Address D. BALLAUF, Model Maker, 414 Seventh street Washington, D. C. 1*

FOR BURLEIGH'S FRICTION CLUTCH PULLIES address E. C. TAINTER, Worcester, Mass. 11 c*

METALLIC LETTERS.—TO FOUNDRYMEN AND Machinists.—Metallic Letters and Figures to put on Patterns, all sizes. Also Branding Iron Letters and Irons. Corporations supplied with figures to number houses, stores, shops, etc. Send for circular and price list. H. W. KNIGHT & BRO., Seneca Falls, N. Y. 16 4*

ENGINEERING. — A YOUNG MAN, RECENTLY graduated from the Engineering Department of Yale College, having the best of testimonials from his Professors and others, is now desirous to enter an engineering establishment where he can apply himself to his profession. Address S. H. WALES, SCIENTIFIC AMERICAN office 15 4

PLATINA.—WHOLESALE AND RETAIL. FOR ALL purposes. H. M. RAYNOR, Importer, 748 Broadway, N. Y. 15 4*

JOHN B. MELDRUM.—WILL HE SEND HIS ADdress to S. WALKER, 476 H. avenue, Boston. 15 2*

TO IRON MEN.
A young man, with some experience in the business, desires a situation as Rolling Mill Superintendent. For further particulars address S. E. N., care of Thomas Bland, 42 Pine street, N. Y. 15 4*

THE IMPROVED PHRENOLOGICAL BUST—SHOWING the exact location of all the Organs of the Brain; designed for Learners. In this Head all the newly discovered Organs of the Brain are given. It shows each individual Organ on one side, and all the groups—Social, Executive, Intellectual, and Moral—on the other. Price, for the largest size, $1 50; and smaller, 75 cents. If sent by express, 25 cents must be added for packing-box. For sale by Booksellers and Druggists. FOWLER & WELLS, 389 Broadway, New York. 15 3*

A SAFE STEAM BOILER.
The subscriber is prepared to receive orders for the "Harrison Steam Boiler," in sizes to suit purchasers. The attention of manufacturers and others is called to this new Steam Generator, as combining essential advantages in absolute safety from destructive explosion, first cost and durability, economy of fuel, facility of cleaning and transportation, etc., etc., not possessed by any boiler now in use. These boilers may be seen in daily operation, driving the extensive works of Messrs. Wm. Sellers & Co., Sixteenth street and Hamilton street; at S. W. Cattell's Factory, Spruce street, Schuylkill; and at Garsed's, Tremont Mill, Frankford. JOSEPH HARRISON, Jr., Washington Building, 274 South Third street, Philadelphia. 15 6*

TRIP HAMMERS (HOTCHKISS'S PATENT) FOR SALE BY C. MERRILL & SONS New York. Send for descriptive circular. See engraving in No. 12, Vol. XI. 13 6*

ALCOTT'S CONCENTRIC LATHES.—FOR BROOM, Hoe, and Rake Handles, Chair Rounds, &c.—Price $25; and all other kinds of Wood-working Machinery, for sale by S. C. HILLS, No 12 Platt street, New York. b

GROVER & BAKER'S HIGHEST PREMIUM ELASTIC Stitch Sewing Machines, 495 Broadway, New York. 1 tf

PORTABLE ENGINES, WITH LOCOMOTIVE PATTERN Boilers of best style, neatly finished: also Hoisting Engines with upright Boilers, new and second-hand Engines of every description, Lathes, Planers, Drills, Boiler Shop Tools, Shafting, Pulleys, and Machinist Supplies, for sale by C. GAY, 29 Doane street, Boston. 13 7*

J. FAY & CO., CINCINNATI, OHIO,
MANUFACTURERS OF
ATENT WOOD-WORKING MACHINERY,
PARTICULARLY DESIGNED FOR
RAILROAD AND CAR SHOPS.
ALSO, FOR
PLANING MILLS,
Hand Blind, Cabinet, Box Wheel, Felloe and Spoke, Stave and Barrel Manufactories, Agricultural Implement Makers, &c.
Warranted superior to any in use. Illustrated Catalogues furnished on application. 8 12*

SOMETHING TO DO.—"PLEASANT AND PROFITABLE."—Good Books, ready sales, and good profits. Agents wanted. Address, with prepaid envelope for answer, FOWLER & WELLS, No. 389 Broadway, New York. 13 4*

ENGINEERS AND MACHINISTS ARE SURE OF getting into the United States Navy as Engineers by applying or addressing, with two stamps, J. HARRIS, 355 North 10th street, Philadelphia, Pa. 13 5*

NERVOUS DISEASES AND PHYSICAL DEBILITY, arising from Specific causes in both sexes—new and reliable treatment, in Reports of the Howard Association—sent in sealed letter envelopes, free of charge. Address Dr. J. SKILLIN HOUGHTON Howard Association, No. 2 South Ninth street, Philadelphia, Pa. 14 12*

A PRACTICAL WORK SHOP COMPANION FOR Tin, Sheet-iron, and Copper-plate Workers. A revised and enlarged edition, containing 120 plates and 180 pages. Sent by mail, free of charge, on receipt of price. Price $2 25. Send for a circular of contents. LEROY J. BLINN, Drawer 345, Detroit, Mich. 13 4*

BEST QUALITY OF
MALLEABLE IRON CASTINGS
Furnished to order and at short notice by addressing "Malleable Iron Works," New Britain, Conn. 13 13*

SAVING OF FUEL TO PARTIES USING STEAM — DAMPER REGULATORS
Guaranteed to effect a great saving in fuel and give the most perfect regularity of power. For sale by the subscribers, who have established their exclusive right to manufacture damper regulators, using diaphragms of flexible vessels of any kind. CLARK'S PATENT STEAM AND FIRE REGULATOR COMPANY, No. 5 Park Place, New York 3 26*

IRON PLANERS, ENGINE LATHES, DRILLS AND other machinists' tools, of superior quality, on hand and finishing, for sale low. For description and price address NEW HAVEN MANUFACTURING COMPANY, New Haven, Conn. 1tf

HOLSKE & KNEELAND, MODEL MAKERS. PATENT Office Models, Working Models, and Experimental Machinery, made to order at 100 Walker street, between Center and Elm. New York. Refer to Munn & Co., SCIENTIFIC AMERICAN Office. 1tf

MANUFACTURERS OF STEAM ENGINES, WITH the link motion, variable cut off of the most approved construction; also Lathes, Mill-gearing, Shafting, Hangers and Machinery in general. Address M. & T. SAULT, New Haven, Conn. 19 26*

PATENTED WOOD BENDERS. — THOROUGHLY tested, and unequalled for bending all kinds of Timbers for Carriages, Furniture, Vessels, and Agricultural Implements. JOHN C. MORRIS, No. 122 East 2d street, Cincinnati, Ohio. 10 10*

REYNOLDS' TURBINE WATER WHEELS.—COMPETENT men are employed to measure streams, make plans, and put in flumes, wheels, and gearing. TALLCOT & UNDERHILL, No. 170 Broadway, New York. 16tf

A VALUABLE WORK FOR INVENTORS PATENTEES AND MANUFACTURERS.

The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents:—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax —Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions —Best Mode of Introducing them——Importance of the Specification —Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

It has been the design of the publishers to not only furnish, in convenient form for preservation, a synopsis of the PATENT LAW and PRACTICE, but to answer a great variety of questions which have been put to them from time to time during their practice of upwards of *seventeen years*, which replies are not accessible in any other form. The publishers will promptly forward the pamphlet by mail, on receipt of six cents in postage stamps.

Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, No 37 Park Row New York.

OIL! OIL! OIL!
For Railroads, Steamers, and for machinery and Burning, PEASE'S Improved Engine and Signal Oil, indorsed and recommended by the highest authority in the United States. This Oil possesses qualities vitally essential for lubricating and burning, and found in no other oil. It is offered to the public upon the most reliable, thorough, and practical test. Our most skillful engineers and machinists pronounce it superior to and cheaper than any other, and the only oil that is in all cases reliable and will not gum. The "Scientific American," after several tests, pronounces it "superior to any other they have used for machinery." For sale only by the Inventor and Manufacturer, F. S. PEASE, No. 61 Main street, Buffalo, N. Y.
N. B.—Reliable orders filled for any part of the United States and Canada. 5 tf

PORTABLE STEAM ENGINES—COMBINING THE maximum of efficiency, durability, and economy with the minimum of weight and price. They are widely and favorably known, more than 300 being in use. All warranted satisfactory or no sale. Descriptive circulars sent on application. Address J. C. HOADLEY & CO Lawrence, Mass. 9 tf

TWIST DRILLS.—ALL SIZES OF STUB'S WIRE Drills; also Twist Drills for machinists' use, varying in diameter by 32nds from 3/4 inch to 1 1/4-inch, together with sockets to fit them. For sale by the "Manhattan Fire Arms Company, corner of High and Orange streets, Newark, N. J. 13 4*

BELKNAP & BURNHAM, MANUFACTURERS OF Globe and Check Valves, also Steam and Gas Cocks, Bridgeport, Conn. 13 4*

FOR SALE. TERMS EASY.
KOKOSING IRON AND MACHINE WORKS,
Located foot of Main street, Mount Vernon, Ohio.
These works were erected by Gen. C. F. Buckingham, for manufacturing Agricultural Implements, Steam Engines, Saw and Grist Mill Machinery, &c.
Buildings all brick, and erected in the most substantial manner, and consist of
Main front building, 45 by 110 feet, 3 stories.
Wing to main building, 30 by 70 feet, 2 stories.
Blacksmith shop, 30 by 70 feet, 1 story.
Foundry, 50 by 80 feet, 1 story.
Foundry, brass, 12 by 15 feet, 1 story.
Pattern Warehouse, 22 by 50 feet 1 story.
Warehouse, 40 by 45 feet, 1½ stories.
Engine and Dry House, 20 by 30 feet, 2 stories.
All inclosed with a high fence; the several shops are well supplied with tools, shafting, belts, &c., for immediate business, and in good running order.
Location is unsurpassed, is healthy, labor plenty, and rents cheap; population over 5,000, and railroad communication to all parts of the country.
Price only $20,000, and may be reduced to $15,000, if certain large tools and patterns are not wanted.
Would take one-fourth or half interest with active business men to manufacture Mowers, Reapers, Threshing Machines, &c., or in any growing business. Reference, Gen. C. P. Buckingham, No 17 South street, New York. For further information address C. & J. COOPER, Mount Vernon, Ohio. 15 4*

PLATINA PLATE AND WIRE, BEST FRENCH, imported and for sale by SAMUEL S. WHITE, Dental Depot, 658 Broadway, New York. 13 4*

AGENTS WANTED TO SELL THE CELEBRATED Franklin Sewing Machine, on a salary or liberal commission For valuable particulars, address Box 302, Boston, Mass. 9 10*

CAVALRY HORSES WANTED.
CAVALRY BUREAU, OFFICE OF ASSIST. QUARTERMASTER,
No. 18 State street, New York, June 10, 1864.
I WILL PURCHASE IN OPEN MARKET ALL THE Calvary Horses that may be presented and pass inspection at the Government Stables, corner of 10th avenue and 25th street, in this city, until further notice.
Payment will be made in checks payable in certificates of indebtedness, when seven (7) or more horses are received. Price, one hundred and sixty dollars each.
6 tf GEO. A. BROWNING, Capt. and Assist. Qr. Mr.

THEYSON & OGG, 39 GREENE STREET, NEAR Grand street, Machinists, Brass Finishers, and Model Makers Experimental Machinery, Indicators, Registers, and Steam Gages of any kind accurately and promptly made. 11 11*

MILL STONE DRESSING DIAMONDS SET IN Patent Protector and Guide. For sale by JOHN DICKINSON, Patentee and Sole Manufacturer and Importer of Diamonds for all Mechanical purposes. Also, Manufacturer of Glazier's Diamonds No. 64 Nassau street, New York City. Old Diamonds reset.
N. B.—Send Postage stamp for Descriptive Circular of the Diamond Dresser. 11 10*

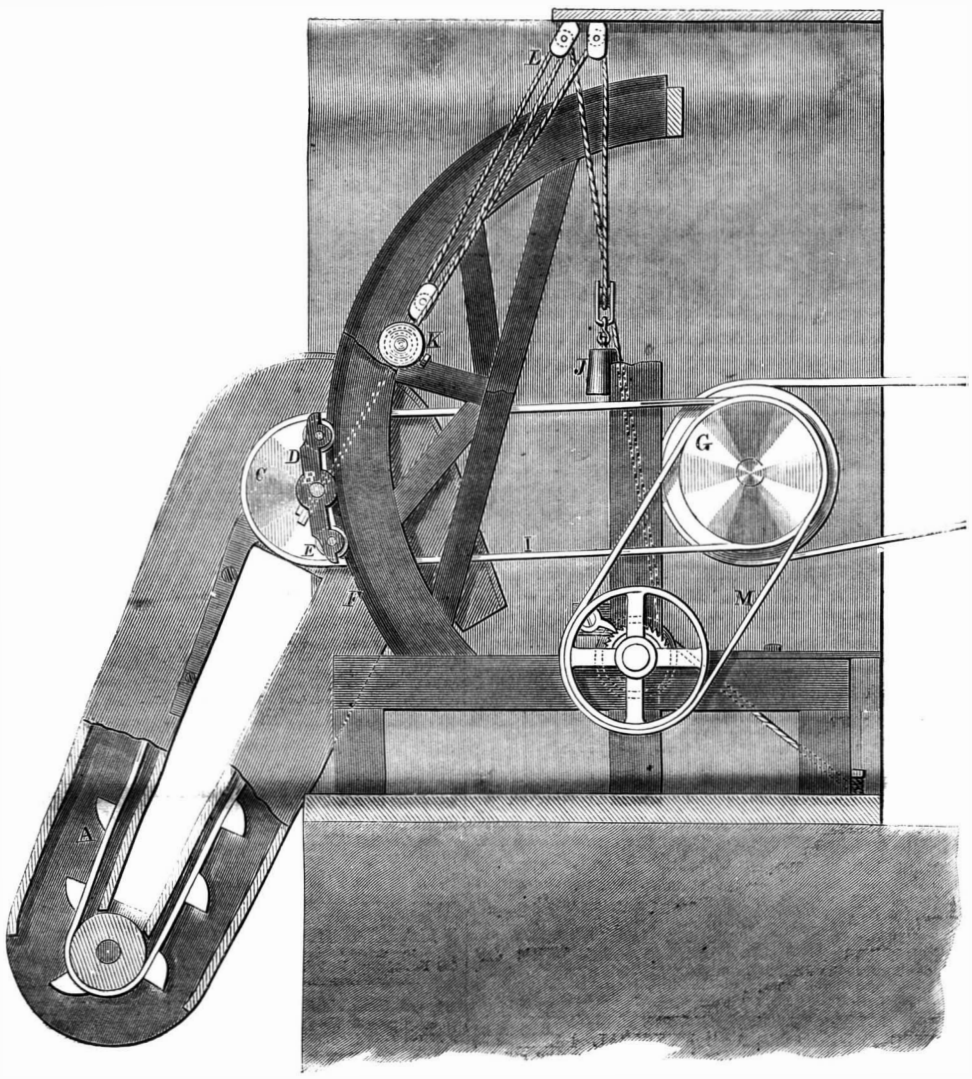
ENGINEERING, CIVIL AND MILITARY; CHEMISTRY, Metallurg, Assaying, &c., at Union College, Schenectady N. Y. For Circular address Registrar. 24 13*

Zur Beachtung für deutsche Erfinder.
Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.
Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu addressiren an
Munn & Co.,
37 Park Row, New-York.
Auf der Office wird deutsch gesprochen.
Daselbst ist zu haben:
Die Patent-Gesetze der Vereinigten Staaten,
nebst den Regeln und der Geschäftsordnung der Patent-Office und Anleitungen für den Erfinder, um sich Patente zu sichern, in den Ver. Staaten sowohl als in Europa. Ferner Auszüge aus den Patent-Gesetzen fremder Länder und darauf bezügliche Rathschläge; ebenfalls nützliche Winke für Erfinder und solche, welche patentiren wollen.
Preis 20 Cts., per Post 25 Cts.

© 1864 SCIENTIFIC AMERICAN, INC.

Tide-water Elevator.

The ordinary grain elevators used in seaports where the tide rises and falls, are constructed with belt tighteners, so that the driving belt can be lengthened or shortened as the level of the water rises or falls. This is an objectionable feature, and the arrangement shown herewith obviates the use of such fixtures entirely. The construction of it is as follows:—The elevator, A, is of the ordinary kind, but the shaft, B, of the pulley, C, has a yoke on it which contains a pair of small rollers, E. These rollers or wheels run upon the track, F, the circle of which is described from the center of the main shaft, G. As the belt on the pulley draws together, naturally, it serves to keep the wheels on the track, and the track tself being struck from the center of the main shaft



MOULTON'S TIDE-WATER ELEVATOR.

permits the elevator to rise and fall without altering the length of the belt, I, in any respect. The weight, J, serves to balance the elevator, the shaft of which is suspended from the yoke, K, and has arms in it which the bearings of the shaft run in. By means of the block and tackle, L, the elevator can be raised and secured at any hight desirable. This operation is aided by the belt, M, passing over the pulley which can be thrown in or out of gear to raise the elevator, as desired.

A patent was granted on this arrangement through the Scientific American Patent Agency on the 21st of June, 1864 For further information address the inventor, J. T. Moulton, Box 2.036, Chicago, Ill. or C. H. Merry, Dunleith, Ill.

American Invention.

No people are so full of ingenious little expedients for saving labor and material as are the Americans. The force of circumstances has made the Yankees a master in the art of extemporizing little "dodges" in mechanism. Self-help is the great lesson a man receives when he sets foot in a new country, and it is in the invention of helps in metal and wood—helps which need no wages, and which never strike, or tire, or grow sick—that the New Englander excels.

There is nothing out of a pantomine more ludicrously clever than some of the inventions which have of late years been introduced into this country from the West. The process of making common pails by machinery is so rapid as to baffle the eye, and so comically instantaneous that the stranger who witnesses it for the first time, laughs over it as a most excellent practical joke. There is a whizz of revolving wheels, a sputter of light shavings, a procession of little staves chasing one another in the air, then another whizz of the collected staves, and the bucket is hooped and made. Scarcely less amusing is the little mechanical device for paring apples by machinery. The machinery is the veriest toy—simple and cheap—but it brings off the rind with an almost magical delicacy, and while it pares the fruit with an accuracy which seems to bespeak a special sense of touch, it slices the apple and takes out the core at the same time.

Success in such small matters has made the American bold, and has trained him to habits of innovation. So far from dreading novelty, he likes novelty for its own sake, and to secure it, he often reverses our way of doing things. In his steamboats he builds up the cabins tier over tier upon deck, instead of below, and he suffers the engine to work high in air above the many stories of cabins. When he wants to put another story to a great building, he adds the new floor at the bottom instead of at the top; and be it a bank, hotel or huge store, he is ready at your command either to lift the entire block or to slide it on its travels to a more eligible location.

In printing newspapers he builds his type upon cylinders instead of laying it upon the slow-working table, and he makes the machine pick up and take off its own printed copies with a regularity and neatness which no number of trained hands can equal. His gunboats are floating martello towers, that can fire fore and aft as readily as from the side. His river steamers are amphibious, and may go anywhere where it is a little damp. He is partial to machinery because it does not grumble, is not impudent, is not extortionate; and hence it comes that his crops are gathered with patent reapers, his linen is washed with wooden hands, his cows are milked by the patent cow-milker, his potatoes as well as his apples are pared by one of the queerest little steel kitchen-maids, who has no "followers," and who wastes none of the fruit; and even his chairs, his tables, and his cabinet work in general, come from manufactories large as our cotton mills, where they are turned out in parts by swift-moving machinery.—*Dundee (Scotland) Advertiser.*

THE DEATH OF CAPT. SPEKE.—The English mails received by the *Asia* bring full particulars of the death of Capt. Speke, the African explorer. He was suddenly killed on the 15th ult., by the accidental discharge of his own gun, while shooting in the neighborhood of Corsham, Wilts. The charge passed through his chest close to his heart, and he died in ten minutes. His age was thirty-eight years. The remains were conveyed to his father's home at Ilminster. It is understood that Capt. Speke, at the time of his death, was preparing for another expedition in the direction of the Nile's source.

THE COTTON SUPPLY NEARLY RESTORED.—The London *Times* says that the cotton imported into England in 1860, amounted to 3,368,000 bales—this year it will be from 2,700,000 to 3,000,000.

THE

Scientific American,

FOR 1864!

VOLUME ELEVEN

NEW SERIES.

The publishers of the SCIENTIFIC AMERICAN respectfully give notice that the Eleventh Volume (New Series) commenced on July 2d, 1864. This journal was established in 1845, and is undoubtedly the most widely circulated and influential publication of the kind in the world. In commencing the new volume the publishers desire to call special attention to its claims as

A JOURNAL OF POPULAR SCIENCE.

In this respect it stands unrivaled. It not only finds its way to almost every workshop in the country, as the earnest friend of the mechanic and artisan, but it is found in the counting-room of the manufacturer and the merchant; also in the library and the household. The publishers feel warranted in saying that no other journal now published contains an equal amount of useful information; while it is their aim to present all subjects in the most popular and attractive manner.

The SCIENTIFIC AMERICAN is published once a week, in convenient form for binding, and each number contains sixteen pages of useful reading matter, illustrated with

NUMEROUS SPLENDID ENGRAVINGS

of all the latest and best inventions of the day. This feature of the journal is worthy of special note. Every number contains from five to ten original engravings of mechanical inventions relating to every department of the arts. These engravings are executed by artists specially employed on the paper, and are universallyacknowledged to be superior to anything of the kind produced in this country.

The publishers of the SCIENTIFIC AMERICAN promise to present as during preceding years, all the latest improvements in Steam Engineering, War Vessels, Ordnance—military and naval—Fire-arms, Mechanics' Tools, Manufacturing Machinery, Farm Implements, Wood-working Machinery, Water-wheels, Pumps and other Hydraulic Apparatus, Household Utensils, Electric, Chemical and Mathematica Instruments, Flying Machines and other Curious Inventions—besides all the varied articles designed to lighten the labor of mankind, not only in the shop and warehouse, but in every place where the industries of life are pursued.

From its commencement the SCIENTIFIC AMERICAN has been the earnest advocate of the rights of American Inventors and the

REPERTORY OF AMERICAN PATENTS.

In this important department, so vitally connected with all the great interests of the country, no other journal can lay any claim whatever, as in its columns there is published a weekly Official List of the "Claims" of all patents granted at the U. S. Patent Office.

THE PRACTICAL RECIPES

alone are oft-times worth more to the subscriber than the amount of a whole year's subscription.

TERMS OF SUBSCRIPTION.

Two volumes of the SCIENTIFIC AMERICAN are published each year, at $1 50 each, or $3 per annum, with correspondingly low terms to Clubs; $1 will pay for four months' subscription. The numbers for one year, when bound in a volume, constitute a work of 832 pages of useful information, which every one ought to possess. A new volume commenced on the second day of July, 1864.

Specimen copies will be sent gratis to any part of the country

Canadian subscribers will please to remit 25 cents extra on each year's subscription to pre-pay postage.

Munn & Co., Publishers,

37 Park Row, New York.

FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.

© 1864 SCIENTIFIC AMERICAN, INC.